Essays on Islamic Finance and Banking

By

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Abstract

Islamic banking and finance have received a considerable attention from academics and practitioners after the global financial crisis. Drawing insights from the theoretical and empirical studies about the resilience and the relative stability of Islamic financing alternatives - compared to their conventional peers- during turbulent economic and market conditions, I found that Islamic alternatives are not as less risky and stable as previously presented.

This thesis makes a contribution to the asset management literature by examining whether Shari'ah compliant exchange traded funds (ETFs) have potential diversification benefits to a volatile portfolio of investments in emerging markets. The portfolio consists of three asset classes: conventional and fixed-income securities in emerging markets and Shari'ah compliant equity. I utilise a dynamic optimisation strategy to capture the time-variability in correlations between Islamic ETFs and other ETFs and find the optimal portfolios accordingly. I back test the results by using a static optimisation strategy and estimating optimal portfolios over two sample periods. The results are new to the literature, since previous empirical evidence is either comparing Islamic and conventional equity or Islamic and conventional bonds using static asset allocation strategies.

Furthermore, this thesis contributes to the literature by taking a holistic approach and analyses the role of Islamic banks on both the micro and macro levels. I examine the effect of Islamic banks' financial distress on other financial institutions and the financial system in 10 Muslim majority countries. The research sample comprises 352 conventional and Islamic financial institutions. I do not consider only Islamic banks' specific characteristics and macroeconomic variables, but I also take in consideration the financial linkages and the spillover effects of financial institutions' distress. This research is pivotal, because it fills a research gap when it comes to identifying the systemic relevance and role of Islamic banks in financial systems. Previous research has adopted a top down approach and has identified the effect of the system on Islamic banks. Given the literature about increasing business risks in the Islamic banking sector, I hypothesise that Islamic banks contribute to systemic risk. In addition, I identify whether the effect of Islamic banks' distress on the system is due to the change in their business risks over time.

The findings of this thesis are new to the literature and provide implications of great importance. Institutional investors should consider the religion effect when they manage their assets, given the evidence regarding the outperformance of Shari'ah compliant equity relative to their conventional peers. They should also be cautious when using dynamic strategies, because they can be more costly to apply specially in volatile markets such as emerging markets and during crisis periods. For central banks and regulator, they should consider Islamic banks as genetically modified conventional banks). If Islamic banks and financial authorities did not address the routes of inefficiency, insolvency risk, and withdrawal risk in Islamic banks, they will continue to contribute to financial systems' distress.

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List of Abbreviations

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
A-DCC	Asymmetric Dynamic Conditional Correlation
AIC	Akaike Information Criterion
ASEAN	Association of Southeast Asian Nations
BEKK-GARCH	Baba, Engle, Kraft and Kroner Generalised Autoregressive Conditional Heteroskedasticity
CAPM	Capital Asset Pricing Model
CDS	Credit Default Swap
CoVaR	Conditional Value at Risk
DCC	Dynamic Conditional Correlation
EEMBLN	Emerging Markets Bond (for UK and Ireland Investors Only)
EEMUS	MSCI Emerging Markets
EM	Emerging Markets
EMBUD	Emerging Markets Bond (FINRA ADF)
EMBUS	Emerging Markets Bond (NYSE)
EMBUT	Emerging Markets Bond (NASDAQ Intermarket)
ES	Excepted Shortfall
ETF	Exchange Traded Fund
EUH	Expected Utility Hypothesis
EWXUS	Emerging Markets Small Cap
GAFUS	Emerging Middle East & Africa
GCC	Gulf Cooperation Council
GJR-GARCH	Glosten, Jagannathan, and Runkle **G**eneralised Autoregressive Conditional Heteroskedasticity
GMFUS	Emerging Asia Pacific
GMLUS	Emerging Latin America ETF
GMMUS	S&P Emerging Markets
GURUS	Emerging Europe
IEEMLN	MSCI Emerging Markets
IFSB	Islamic Financial Services Board
IGARCH	Integrated Generalised Autoregressive Conditional Heteroskedasticity
ISDELN	Emerging Markets Shari'ah compliant equity Traded in London
ISDULN	USA Shari'ah compliant equity
ISDWLN	World Shari'ah compliant equity
IUSEGR	Emerging Markets Shari'ah compliant equity Traded in Germany
JAKISL	Jakarta Islamic Stock Index
LASSO	Least Absolue Shrinkage Section Operator

List of Abbreviations (Continued)

LE	Loss Exceedance
LIBOR	London Interbank Offered Rate
LTCM	Long Term Capital Management
MAE	Mean Absolute Error
MPT	Modern Portfolio Theory
PLS	Profit and Loss Sharing
RMSE	Root-Mean-Square Error
S&P	Standard and Poor
SIC	Schwarz Information Criterion
SRISK	Systemic Risk measure
UAE	United Arab Emirates
UK	United Kingdom
US	Unites States
VaR	Value at Risk
VEC-GARCH	Vector Error Correlation Generalised Autoregressive Conditional Heteroskedasticity
VWOUS	FTSE Emerging Markets
ΔCoVaR	Marginal Conditional Value at Risk

Chapter 1: Introduction

1.1 Background of the Research Questions

The effects of religions on economics vary within and across religions (Gay, 1991; Kuran, 1993). In this regard, Shari'ah compliant investments and Islamic banks have been promoted as more stable financing alternatives, particularly after the global financial crisis (Al-Rifai, 2012; Lean and Parsva, 2012). This is when their conventional comparable were hit significantly due to excessive speculation, low-quality credit and toxic investments.

Islamic banking was established in the middle of the 20th century, with the intention of providing financial services which are compliant to the Islamic law "Shari'ah" and emphasise on values such as fairness, equity and social welfare. According to the Islamic law, any financial transaction or investment should adhere to the following standards: the prohibition of interest rates, avoidance of speculation and uncertainty, and emphasising the necessity of asset-backed investments (Al-Qaradawi, 2013).

Despite the said advantages of Islamic financial alternatives, empirical evidence about them is mixed. Some studies find that Shari'ah compliant investments are lower in risk compared to their conventional peers (Mansor and Bhatti, 2011; Milly and Sultan, 2012; Abdullah et al. 2007; Merdad et al. 2010; AL-Zoubi and; Maghyereh, 2007; Hassan and Girard, 2011; Aka, 2009; Alam et al. 2013; Azmat et al. 2014). Other studies do not (Jawadi et al. 2014; Hakim and Rashidan 2002; Hayat and Kraussl 2011).

In addition, Islamic banks are experiencing significant business risks such as inefficiency, liquidity risk, credit risk, failure risk and operational risk (Bacha, 2008; Khan and Ahmed, 2001; Blackburn and Forgues-Puccio, 2010; Manlagñit, 2011, Djennas, 2016; Errico and Farrahbaksh, 1998; Abedifar et al. 2013). Other studies warn of increasing business risks in Islamic banks (Beck et al. 2013; Gheeraert and Weill, 2014; Abedifar et al. 2016; Sorwar et al. 2016; Pappas et al. 2016). However, these studies still argue that Islamic banks are more stable than conventional ones. Motivated by this evidence, we state the following research problem.

1.2 Statement of the Problem

Given the previous background, need arises to investigate if Islamic finance and banking have any positive implications on the professional asset management practices and the stability of the financial systems.

1.3 Objectives of the Research

1. Use dynamic and static asset allocation strategies to estimate and evaluate the risk-adjusted return of a portfolio which contains three asset classes: conventional equity in emerging markets (EM), fixed-income in EM, and Shari'ah compliant equity ETFs in EM, USA and the world.
2. Test whether or not Shari'ah compliant equity can outweigh EM conventional fixed-income securities in an EM portfolio.

3. Measure the financial distress of Islamic banks.
4. Examine how Islamic banks affect other financial institutions and the financial system.
5. Investigate whether there is a time-variability in the effect of Islamic banks on financial systems.

1.4 Research Hypotheses

Chapter 3

H1: Shari'ah compliant equity ETFs improve the risk-adjusted returns of a portfolio comprising conventional emerging markets ETFs.

H2: Shari'ah compliant equity ETFs can outweigh emerging markets fixed-income securities in the asset allocation, during periods of volatile interest rates.

H3: Dynamic allocation strategy outperforms static allocation strategy in emerging markets during crises periods.

Chapter 4

H1: Islamic banks' financial distress affects other financial institutions and has spillover effect in financial systems.

H2: Islamic banks are relevant to the financial system and contribute to its systemic risk.

H3: There is a time-variability in the effect of Islamic banks on the system, due to the variation in their business performance and bank-level characteristics.

1.5 Contribution of the Research

Economic theorists have argued that there is a relationship between religion and economics and many studies proved that this relationship exists (Ulbrich and Wallace, 1983 and 1984; Neuman, 1986; Barro and McCleary (2003); Samuelsson, 1993; Grief, 1994; Beit-Hallahmi and Argyle, 1997; among others). This research is positioned in the existing literature about norm-restricted investing as argued by "the neglect effect hypothesis" by Hong and Kacperczyk (2009) and how it affects the performance of religion restricted investments and other investments. It is also based on the literature about how social factors affect individuals' economic behaviour, and economic systems as argued by Becker's (1957) theory "the negative effect of social norms" and Kuran's (19935) theory "preference falsification".

My first empirical chapter (Chapter 3) investigates the diversification effect from adding Shari'ah compliant equity ETFs to a portfolio which contains a broad range of emerging market assets during the period 2009 to 2015. In Chapter 3, my contribution to the previous literature is twofold. First, I estimate and evaluate the riskiness of a portfolio which has a mixture of three asset classes: conventional equity, conventional fixed income, and Shari'ah compliant equity. Previous studies only compared conventional assets with Shari'ah compliant assets (Jawadi et al. 2014; Arouri et al. 2013; Dharani and Natarajan, 2011; Ho et al. 2013; Hoepner et al. 2011; Al-Zoubi and Maghyereh, 2007; Aka, 2009; Sukmana and Kolid, 20102; Cakir and Raei, 2007).

Second, standard finance theory suggests that the inherited risk in fixed-income securities is usually less than any form of equity (Cakir and Raei, 2007). Nonetheless, Islamic scholars claim that the relative absence of interest rates in financing businesses makes Islamic assets less risky and more resilient in market downturns. I address this argument by testing whether or not Shari'ah compliant equity can out-perform emerging markets fixed-income securities. Third, Chapter 3 contributes to the wider literature in asset allocation and portfolio optimisation by investigating Shari'ah compliant equity ETFs' performance using dynamic asset allocation strategies. Prior empirical evidence on Islamic assets' performance and their diversification benefits on a global level is mixed (Arouri et al. 2013; Hassan and Girard, 2011; Hayat and Krauessl 2011).

My second empirical chapter (Chapter 4) contributes to the literature about Islamic banks' performance and financial systems' stability in two ways. I examine the effect of Islamic banks' financial distress on other financial institutions, by jointly considering their own specific characteristics, macroeconomic variables and financial linkages. Previous research has either focused on Islamic banks' characteristics solely or modeled their propensity to failure risk compared to those for conventional banks (Gheeraert, 2014; Wanke et al. 2016). My research is different from these studies in terms of the selection of the possible relevant drivers of Islamic banks' performance. I do not consider only bank-level variables and macroeconomic variables, but I also take into consideration the linkages and the effect of tail-risk spillovers from and to Islamic banks.

Lastly, I contribute to the literature by examining the relevance of Islamic banks to the stability of financial systems. Previous research follows top-down approach, where they analyse the effect of economic stress and financial instability on the business risks of Islamic banks (Sorwar et al. 2016; Bourkhis and Nabi, 2013; Djennas, 2016; Beck et al. 2013; and Khan, 1991). I follow a bottom-up approach where I tests the effect of Islamic banks on the financial system. The advantage of my approach is that I estimate Islamic banks' financial distress using conditional VaR and given their specific characteristics, macroeconomic variables, and financial system structure. Then, I determine whether their financial distress is systemically relevant.

1.6 Data

I use in Chapter 3 the daily logarithmic returns of 17 ETFs traded in three of the largest international markets (the United Kingdom, the United States, and Germany). It covers the period from September 2009 to the end of 2015. My sample period and asset combination helps us to further assess the validity of such arguments. In Chapter 4, research data consists of weekly balance-sheets, macroeconomic and market data of 352 financial institutions in 10 Muslim majority countries and covers the period from the beginning of 2010 to the end of 2015. This period is important to investigate the marginal contribution of the Islamic banking sector to the system.

1.7 Significance of the Study

The significance of this thesis emanates from the empirical investigation of the viability of Islamic financial assets and Islamic banks as options for enhancing the performance of investment portfolios and stabilising financial systems. Previous studies are comparative rather than experimental. They compared different religions and their effect on different economic aspects and they compared Islamic finance to its traditional (conventional) comparable. I create a context in this thesis to move one step forward and ask a simple question: Does Islamic finance work as it is intended to?

Findings from Chapter 2 are of particular interest to international portfolio managers looking for investment alternatives to improve the risk-adjusted return for a portfolio of emerging markets investment. It provides evidence about the effect of Shari'ah compliant investments on stabilising an emerging market portfolio. In addition, I provide evidence about the performance of dynamic and static optimisation strategies during tranquil and volatile periods in emerging markets. This helps portfolio managers in deciding the appropriate strategy to follow, and which one would be more costly to implement.

Moreover, the findings in Chapter 4 are of a great importance to financial authorities, regulators and risk managers. I find that Islamic institutions generally have significant effects on conventional and other Islamic financial institutions, where network connections are the most influential factor when it comes to financial institutions' distress. Also, Islamic banks are found to contribute to the instability of financial systems as their conventional peers do. Finally, I find that there is a time-variability in the effect of a number of Islamic banks due to their own specific-characteristics. These results indicate an urgent need for enforcing clear risk management practices in Islamic banks. It also builds upon the literature in risk management in Islamic finance and financial stability.

1.8 Structure of the thesis

This thesis starts with the general literature review in Chapter 2, which will demonstrate the theories and empirical evidence about the relationship between religion and economics, explain what Islamic economic framework is and critically discuss the existing empirical evidence about Shari'ah compliant assets an Islamic banks.

In Chapter 3, I will focus on empirically testing the diversification effect from adding Shari'ah compliant equity to a portfolio of conventional emerging market assets.

In Chapter 4, I will investigate the financial distress of Islamic banks, determine their role in the financial system, and make conclusions about whether Islamic banks help in stabilising financial systems in different countries.

Finally, Chapter 5 will provide a summary of my research findings, and I will conclude the thesis by outlining the future areas of scholarship, the problems and implications to researchers, practitioners and regulatory authorities, and research limitation.

Chapter 2: General Literature Review

2.1 Introduction

This thesis investigates whether Islamic assets and banks reap potential benefits from an investment and risk management perspectives. There has been a considerable expansion worldwide in Islamic banking sector, and Islamic financial markets over the last decade. According to Ernest and Young (2016), the Islamic banking sector has exponentially grown by over 47% since 2014. This was in line with the prediction which has been made by UK Trade and Investment (UKTI, 2013) about the increase in Islamic finance industry, where the total value of Shari'ah compliant assets has grown by 150% since 2006. There are two possible reasons behind this growth. First, there is an increasing Muslim population which represents the main base of clientele for Islamic banks and Islamic investments. According to the Pew Research Centre's report (2015) on Religion and Public Life, Muslims are the fastest growing population, expected to grow by 73% over the next 4 decades. Muslims represented 23.2% of the world's population in 2010, and are expected to represent 30% of the world's total population by 2050. Second, the wake of the global financial crisis in 2008 has shifted the attention of many academics and practitioners to Islamic finance and banking alternatives. This is because Islamic financial services and investments are theoretically promoted as safer, more stable and equitable financing source.

In this chapter, I start by discussing the theoretical facets and empirical evidence about the relationship between religion and economics motivate which this research. Then, I will demonstrate the underpinning rules of the Islamic economic framework and the different types of Islamic assets and financial services. Finally, I will provide an extensive and critical comparison between Islamic banks / assets and their conventional peers, given the existing empirical evidence.

2.2 Religion and Economics

The role of religion in decision making has been widely documented theoretically and empirically. Before outlining the key theories and empirical research covering this matter, one should understand what a religion is. Religion is a doctrine which comprises a set of values and beliefs followed by a group of agents (institutions and individuals). This group is said to be following a particular "faith" (Stark and Bainbridge, 1985). There are many theoretical underpinnings which argue that emotions and feelings affect economic behaviour, judgement and decision making. Loewenstein et al. (2001) argue that when people face situations which involve high uncertainty and risk, their emotions often affect their decisions. This makes emotional reactions direct decision making and dominate behaviour (Simon, 1967). According to Gay (1991), Kuran (1993), Pryor (1990) and Siddiki (1981), religious economics have emerged when Christian theologians, national council of churches, clerics, Islamic economists and Evangelical Protestant economists seek to analyse and explain the reasons behind implementing taxation, banking and redistribution of income. Webber's (1930) theory is that Protestants in particular are the ones who motivated modern capitalism by promoting for values such as thrift, risk taking, and individual financial responsibility. In his view, Protestants wanted reformation in taxation, banking and redistribution of income which led to capitalism. However, no empirical evidence supports this theory and it was falsified by Samuelsson (1993) who finds that early Protestants theologians did not have interest in understanding economic matters or markets.

The question remains: how religion affects the economic behaviour of people? From positive psychology literature, religion promotes feelings such as social support and encourages social participation and optimistic behaviour. This extends to economic and investment decisions of followers (Beit-Hallahmi and Argyle, 1997). Similarly, Grief (1994) argues that individualist (as opposed to "collectivist") cultural beliefs encourage economic growth, exchange and innovation.

Nonetheless, the impact of religion on economic behaviour and thinking is far from uniform. There is a considerable variation in economic thinking and behaviour across and within religions. Gay (1991) and Kuran (1993) posit that economic statements issued by representative religious bodies are widely different in a specific religion. For example, in Christianity, the economic positions for Fundamentalists, Liberals, Protestants and Catholics are different. Pyle (1993) finds also that Evangelical Protestants are less conservative regarding income redistribution than average Americans.

Moreover, many economists have tried to model how variation in religious beliefs affects income in particular. Azzi and Ehrenberg (1975) argue that religious activities occur at the expense of productive activities. So, they propose a household production framework which assumes that religiosity increases by age (when capacity to work decreases) and directs more focus on the rewards which will be gained in the afterlife.

Literature shows mixed evidence from different religions about this model. Ehenberg (1977) confirms Azzi and Ehrenberg's model. Neuman (1986) use data for Jewish male workers in Israel and his results support the model too. On the other hand, Ulbrich and Wallace (1983, 1984) and Sullivan (1985) find insignificant results to prove this model. In addition, Barro and McCleary (2003) developed upon Azzi and Ehrenberg's model, and separate between religious beliefs and physical religious activity (i.e. church attendance). They find that an increase in church attendance without strengthening beliefs could depress income.

More studies have broken down the relationship between religiosity and income levels to control for low and high-income countries. Some characteristics of a particular religion suggest that negative effects are larger in low-income countries and the positive effects are smaller when there is less capital (Desdoigts, 1999). This theory has been empirically tested by various studies. However, empirical evidence is mixed. Bettendorf and Dijkgraaf (2010) hypothesise based on Desdoigts's theory that positive effects on income in high-income countries are driven by religion. Using panel data for 25 Western countries, Bettendorf and Dijkgraaf (2010) findings support this hypothesis. Barro and McCleary (2003) state that beliefs affect income positively and church attendance affects income negatively in 41 countries. Studies such as Chiswick (1983, 1993), Tomes (1985), Heath et al. (1995) and Steen (1996) find positive effect of Judaism on income. Tomes (1985) find insignificant effect of religion on the income of Protestants and Catholics. Also, Heath et al. (1995) find insignificant effect on the income for liberal Protestants and negative effect on that for Catholic and Orthodox Protestant). Whereas, Steen (1996) finds negative effect of religion on the income of Protestants. This considerable variation in evidence has continuously posed the question regarding the direction of the relationship between religion/beliefs/moods and income.

There are theories which view religion as an establishment whose followers (institutions and individuals) can profit from it, punish disobedient, and view any secular economic aspect as a threat. Adam smith in 1786 stated straightforwardly that market forces constrain churches just as they constrain secular firms. This makes religions perceive monopoly, government regulations as real threats for them as for other sector of the economy.

On the prohibition of interest rates, Ekelund et al. (1989) argue that the church's usury from medieval Catholicism drove it towards too monopolistic positions similar to a firm which controls all borrowing and lending. Ekelund et al. (1989) theorise that usury rules made churches exploit people and borrow at low rates and lend at higher rates. Opposite to that, Carr and Landa (1983) and Glaeser and Scheinkman (1998) argue that usury rules protected the society by providing insurance against unexpected shocks. This raises again the issue of the heterogeneous economic positions within and across religions. For example, Liberal Christians, Fundamentalists and Protestants would disobey the Catholic Church if they were charged higher rates for their loans. In all cases, this creates two scenarios when such religious competition exists. The first scenario: it can benefit societies by forming a Unitarian faith which promotes prosperity, the existence of one regulator and help people prosper

(Healey, 1984). The second scenario: based on David Hume, religious competition can lead to clashes amongst people, intolerance of differences and superstition (Anderson, 1988).

Distinctiveness and exclusivity of specific beliefs or norms may benefit or detriment their followers. Becker (1957) argues that agents pay more for their discriminatory preferences arising from social norms. Such discriminatory preferences make people select specific things and refrain from other things. In the context of stock markets, Hong and Kacperczyk (2009) develop the neglect effect hypothesis, which argues that neglecting specific stocks by big investors means that the prices of these stocks will be lower than their fundamental values, because of limited risk sharing. Merton (1987) shows that Capital Asset Pricing Model (CAPM) does not hold true anymore. This is because pricing is no longer based only on beta but on idiosyncratic risk too. There are two assumptions underlying Hong and Kacperczyk (2009) hypothesis. First, when neglecting specific stocks, investors limit their arbitrage opportunities, because of a set of constraints and risks (Shleifer and Vishny, 1997). Second, Hong and Kacperczyk (2009) also witnessed that the neglect effect of by institutional investors was stable over their sample period. Interestingly, Hong and Kacperczyk (2009) test their hypothesis by investigating whether sin stocks[1] outperform their comparable in US, Europe and Canada from 1965 to 2006. They find that expected returns of sin stocks outperform their counterparts (except for tobacco companies which face litigation risks). Also, the market to book ratio and earning per price of sin stocks are 15% to 20%

[1] Sin stocks are equity for companies which operate in alcohol, tobacco and gaming industries.

lower than their comparable. This implies that there is a significant financial costs related to norm-constrained investing.

In addition, social norms can have a negative impact on economics. Kuran's (1995) theory of "preference falsification" explains the reasons behind why some cultural norms are economically inefficient. Kuran (1997) argues that Islamic countries have isolated itself and have lagged that of the west for most of the millennium, due to Islam's static world view.

Nevertheless, based on evidence proposed by Loewenstein et al. (2001), many empirical studies provide weak support for the above theories and prove that religious norms can have positive effects on stock markets. Frieder and Subrahmanyam (2004) examine the Jewish sentiment on US equity market, by analysing return and volume around major Jewish High Holy Days, during which the stock market is open. They find that stock returns are considerably higher during Rosh Hashanah (the Jewish New Year) and the prior two days, but significantly lower the day after (Somber Day). For trading volume, it is found to be lower on both days. Frieder and Subrahmanyam (2004) justify this by the sentiment of Jewish investors and their trades around these holidays.

For Muslim investors, given that Ramadan (the holy Islamic month) is characterised by positive mood and social interaction, Bialkowsi et al. (2012) examine whether religious practice influence investors' psychology. In particular, they examine the stock market effects of Ramadan in 14 Muslim majority countries from 1998 to 2007. They find that Ramadan promotes the feeling of solidarity and self-reflection and stock returns in Ramadan are on average much higher and less volatile compared to the rest of the year. Also, Gavriidies et al. (2015) examine the religion effect on investors' behaviour in 7 Muslim majority countries. They find that investors tend to herd during Ramadan, and herding is more significant in Ramadan days compared to non-Ramadan days. Although, studies such as Al Hajeh et al. (2011) and Al-Khazali (2014) are in line with Bialkowsi et al. (2012). However, Seyyed et al. (2005) document no significant change in expected returns in the Saudi Arabian stock market during (Ramadan) from 1985 to 2000. They find also a considerable decline in volatility in the same market.

Given this theoretical and empirical evidence, there is certainly a religion effect on different economic aspects and on financial markets performance. That is said, the next section shows the main questions addressed and positions this thesis in the existing literature.

2.3 Research Gaps

Motivated by this evidence, I will examine the effect of Islamic finance on: i) the decision making of assets allocation and ii) financial system's stability. The well documented relationship between religion and economics focuses on the micro-level of the economy or the financial system. Given "the neglect effect hypothesis" by Hong and Kacperczyk (2009) and "the negative effect of social norms" argued by Becker (1957), this thesis is adding to the bigger scope of the literature by questioning the viability of Islamic finance as an alternative for portfolio managers, and whether it can have positive implications on the professional asset management practices (Chapter 3). It will also test the validity of "theory of preference falsification" by focusing on the role of Islamic banks in stabilising the financial systems by taking a micro and macro-economic perspectives (Chapter 4). To my knowledge, these contributions are new to the literature in Islamic finance, portfolio management and measuring stability of financial systems.

2.4 Islamic Economic Framework

The Islamic economic framework has four major features which are enforced on Islamic investments and banking operations by the Islamic law or Shari'ah. These features are i) avoidance of excessive uncertainty, ii) interest prohibition, iii) Profit-and-Loss Sharing (PLS) and iv) necessity of asset backing (Ayub, 2002).

First, Islamic law prohibits excessive uncertainty or (*Gharar)* about the price, quantity or quality of a product or service provided, and prohibits (*Mysir or gambling*) in the form of games of chance Al-Qaradawi (2013). This is to encourage parties involved in any kind of contract to conduct due diligence before committing to it; hence, any party involved becomes more responsible and accountable, and maintains fairness in all commercial transactions. Jurists are greatly responsible for determining the extent of *Gharar* in a transaction, and based on the circumstances of a particular transaction, they may or may not invalidate the contract. For example, when it comes to stock investing, many people question; why stock investing is permissible in the Islamic framework?

The raised concerns came from the idea that the trading in the stock markets is based on speculation. However, trading in stock markets is partly based on fundamental analysis of economic variables and historical performance of certain business instead of pure speculation. In contrast, trading in derivatives[2] or short sale for example is not permitted, because it is based on an analyst's or an investor's expectations and it involves trading assets which are not initially in their possession (Kamali, 2000).

Theoretically, if I refer back to Expected Utility Hypothesis (EUH) and Modern Portfolio Theory (MPT) developed by Bernoulli (1954) and Markowitz (1952) respectively, I also find that they are based on the risk-averse attitude in decision making under uncertainty. In practice, when Iqbal (2010) examines whether the variance for a given investment decreases if it is financed by equity rather than by a mix of equity and debt. He finds that 1% increase in the debt-equity ratio increases the investment's risk at an increasing rate without increasing its overall expected return.

Second, the rationale behind interest prohibition in Islam is very similar to the prohibition of interest imposed on the medieval churches. Money is considered as a tool for exchanging goods and services, but it has no value in its own. It cannot be exchanged at any cost, because it eventually exploits the borrower economically (Pryor, 2007). Even lending money with interest is not fair in case of using the funds productively or unproductively by the borrower. For example, when the funds lent are used productively in a way that creates additional wealth, the lender will not get any additional wealth, but instead a fixed return regardless of the outcome of the business. The lender in this case surrendered his property rights to the

[2] Derivatives can be used for hedging fundamentals-based risks as well, speculation aside.

borrower, and in case the funds lent are not used productively, no additional wealth is created, and no one should claim any additional property rights (Saleh, 1992).

The difference between the interest rate offered by conventional banks and the rate of return offered by Islamic banks is that the former is predetermined, whereas the latter is expected but not pre-agreed. In other words, returns of Islamic investments are not known until the end of the investment period, and if the prevailing yields in the market change, investors may expect similar yields from Islamic banks (Saleh, 1992). That is why the propensity of Islamic banks to business risks is higher (Ahmad, 2009). Islamic banks come under pressure when they are expected to pay their investment depositors a rate of return higher than that under the actual investment contract's terms. This makes them more vulnerable to withdrawal risk when the expectations of their investment depositors are not met and depositors withdraw their money (Zineldin, 1990). In addition, the limited access to leverage and the absence of interest in the operations of Islamic finance institutions exposes them to higher credit risk (Azmat et al. 2014; Abedifar et al. 2013).

According to Dar and Presley (2000), there are mainly three financial transactions which lead to higher credit risks in Islamic banks. First, credit risk happens in Murabaha when the bank delivers the asset to the client but does not receive payment from the client at the same time. In a non-binding Murabaha, the client has a right to refuse the delivery of the product bought by the bank, hence the bank becomes exposed to price and market risks (Siddiqui, 2008). This implies that the cost-to-income ratio will be higher and there will be a negative effect on the Islamic bank's efficiency. Second, in Bay al-salam or Istisna contracts, there is the possibility that the bank fails to deliver the goods on time or deliver the quality of goods as the contract specified (Iqbal and Llewellyn, 2002).

This could result in a delay or a default in payment by the client, and the bank faces significant financial losses. Third, in Mudarabah investments, the bank represents the principal and work along with an external mudarib (agent). Beside the principal / agent conflicts, this type of contract does not give the bank proper rights to observe the agent's activity or participate in the business management (Siddiqui, 2008).

The problem is that Islamic financial institutions are helpless when it comes to the case of default by the counterparty (Bashir, 1996). They are not allowed to charge any accrued interest or impose a penalty, except in the case of deliberate negligence. Indeed, the bank's capital during the delay is not productive and its investors and depositors do not earn any additional income. In case of proven negligence or misconduct of the agent or the managing partner in participation contracts, the bank's share in capital invested will be recovered following the same rules applied for debt recovery, however it is difficult to prove negligence or keep evidence of misconduct (Archer et al. 1998). In addition, many developing countries lack official records of credit data and banks depend solely on clients' track credit record. Thus, Islamic financial institutions cannot maintain good quality data on past performance of the counterparty and determine the probability of default. The non-existence of an Islamic index rate of return is another problem, because Islamic banks often use LIBOR as the benchmark, which align their market risk closely with the movements in LIBOR rates (Khan, Ahmed, 2001).

Overall, this makes the assessment and management of credit risk very difficult, because there are insufficient regulations by financial authorities when it comes to the required level of financial disclosure and monitoring the agent's performance (Obaidullah, 2002). Therefore, the importance of credit-risk management becomes more critical. This leads us to question whether bank-specific characteristics of Islamic banks make it more or less financially distressed.

The third feature of the Islamic economic framework is Profit and Loss Sharing (PLS). Islamic law promotes PLS, where the Islamic financial instruments such as *Mudharabah* partnership and the Musharakah facility are not interest based and allow the lender to become a partner in the business and shares in its risk. The lender also becomes liable for its debts as a shareholder, and receives a return (a dividend) only when the business is profitable. The main problem with PLS financing is moral hazard (Nienhaus, 1983; Noman, 2002). In some situations, the owner of the business is not known to the financer. Other time, the entrepreneur submits different accounting books are presented to the financer and eliminate major costs that would make the business look disadvantageous. Accordingly, Islamic banks avoid them and mainly use non-PLS financing alternatives (Aggarwal and Yousef, 2000; Baele et al. 2014). The percentage of finance which is based on PLS principles is very low. In Malaysia it represents only 0.5% of total Islamic banking sector's financing (Chong and Liu (2009). Even in Indonesia (the largest Muslim country), the Bank Indonesia Report (2009) shows that PLS financing represented only 35.7% of total Islamic banking sector's financing by the end of 2008.

The fourth and last feature of the Islamic economic framework is the necessity to base any economic activity on a real asset or productive activity. This brings us to the point that any debt-based financial instrument should be based on an asset or a productive business, where owners share the risk and return. For example, Islamic *Sukuk* or Islamic bonds should be directly related to a real asset. They may appear to be similar to conventional bonds, because they are issued based on a wide range of asset types, and provide a predictable level of return. However, the assets' types under conventional bonds include mortgages, auto loans, accounts receivables, and home equity loans which involve interest payment. On the contrary, *Sukuk* qualify its holder (investor) for a partial ownership of an asset for a certain period of time, during which the holder is accountable for the risk and return of the generated cash flows of the underlying asset.

In addition, while a bond creates a lender / borrower relationship, the relationship in Sukuk depends on the nature of the underlying contract. For example, if the underlying contract is a lease (Ijarah), this creates a lessee / lessor relationship. Creating Sukuk starts when the issuer (government) assigns a special purpose vehicle (SPV) which is a legal entity to administer the payments made to the investors and hold the title to the assets on which the Sukuk is based (Dommisse and Kazi, 2005). Then the SPV issues certificates of participation to the investors who want to hold their liquid assets in a Shari'ah complaint form such as Islamic banks, investment companies and Islamic insurance companies "Takaful".[3] In return, in-

[3] Takaful or Islamic insurance is a financial service some Islamic banks and Takaful institutions provide. It enables policyholders to mutually protect each other from losses. In Takaful, there should be separation between policyholders' fund and shareholders' fund. This protects shareholders who may need their fund in case they face underwriting losses. Accordingly, policyholders will not be able to use except their fund to support any insurance operations.

vestors pay the SPV in advance, and the certificate entitles them to a future refund on the investment plus a pre-agreed expected mark-up. Another point of concern regarding Sukuk is there are many arguments that *Sukuk* are similar to conventional bonds, because of the matter of mark-up. However, the mark-up in case of *Sukuk* is expected and calculated based on the expected potential business or asset performance and it can be changed (Al-Amine and Al-Bashir, 2001).

Therefore, any *Sukuk* issuer should be careful with their investors' expectations, and make sure of their understanding of the right nature of *Sukuk* and its expected returns. In addition, the Shari'ah acceptability of the underlying assets acquired by the SPV should be taken in consideration, while the tradability and negotiability of issued certificates is determined based on the nature of the underlying assets (Al-Amine and Al-Bashir, 2001). It is critical for investors to know who owns the underlying or securitised assets in a particular Sukuk type, because risks can change depending on the contract type (El-Din and Ibrahim, 1991).

The Accounting and Auditing Organisation of Islamic Financial Institutions (AAOIFI) recognises the following four basic Sukuk structures: Ijarah, Head-lease and sub-lease, Wakalah and Istisna' (Usmani, 2007):

- Ijarah Sukuk must have underlying tangible assets such as plant, machinery, and buildings or have usufruct rights pertaining to tangible assets, and involve a sale and lease back of tangible assets (or their usufruct rights). This is the most commonly used type of Sukuk, because it is widely accepted by Shari'ah, and their documentation is relatively easier than the other types. While the main concern for them is that the underlying assets should be identified, where 100% of the assets have to be tangible and remain in the ownership of investors till maturity and available at time of sale (Wilson, 2004).

- Head-lease and sub-lease Sukuk are similar to Ijarah Sukuk in that they must have underlying tangible assets. Though, instead of including a sale transaction, they involve long and short term leases of tangible assets. This type of Sukuk is tradable in secondary markets, widely accepted by Shari'ah standards and involve easy documentation of the contracts, because of the absence of any sale transactions. Similar to Ijarah Sukuk, tangible assets should be identified to enforce any operating rights and evaluate their Shari'ah compliance. Also, the contract should cover at least a period of five years to be in line with Shari'ah standards and avoid any short term price speculation (Wilson, 2008).

- Wakalah Sukuk, for which the underlying asset should be managed by an investment manager called "Al-wakeel" who manage the assets for a fee. The underlying asset can be tangible assets such as these under Ijarah Sukuk, investments compliant to Islamic law -excluding media, alcohol, porn, pork and gambling industries-, or Sukuk certificates. The main benefit of Wakalah Sukuk is they are easily executable if Shari'ah compliant assets are available. Whereas, the main concerns are the identification of assets and substitution, and that assets need to have a value at or greater than the amount raised (El-Din and Ibrahim, 1991).

- Finally, Istisna’ Sukuk either have revenue generating agreements as underlying assets or they should be linked to a business activity. The issuer has certain rights and obligations and can use the income generated from the investment to service the periodic payments. This type of Sukuk has no tangible assets’ requirements, assets can be long-term agreements, and issuers do not give up operating control of the business. However, the identification of assets and their suitability should be taken with great concern, and significant due diligence on business risks should be maintained (Wilson, 2004).

Overall, there is a shortage of supply in Sukuk market, because investors to buy and hold the contract, rather than trading it in the market (Jobst et al. 2008). This has created serious liquidity issues in the market which I will discuss in section 2.5. In the next section, I critically discuss the previous empirical evidence regarding the performance of Shari’ah compliant equity and Sukuk in the financial markets.

2.5 Performance of Shari’ah Complaint Investments

The current debate about Islamic financial instruments (equity and fixed-income securities), identifies an interesting viewpoint on how they are performing relative to the conventional ones during bullish and bearish markets. Generally, Islamic markets outperform conventional ones in terms of risk-adjusted returns during financial crises.

The empirical evidence regarding their risk levels is rather mixed. Back to the dot-com crisis and global financial crisis, evidence from the United states, the United Kingdom, Malaysia, Indonesia, Hong Kong, Switzerland, India and France shows that the majority of Islamic indices are more rewarding than conventional ones (Mansor and Bhatti, 2011). Also, Ho et al. (2013) find that Dow Jones, MSCI, Russell, S&P, Kuala Lumpur, Jakarta, Hong Kong and Swiss Shari'ah compliant equity Indices are more resilient towards the 2008 financial crisis relative to conventional stock index (MSCI all World Index). Milly and Sultan (2012) report similar findings when comparing Islamic stocks listed globally with conventional stocks and socially responsible investment stocks during the same crisis. Even after the crisis, the analysis of the Dow Jones, FTSE, MSCI indices on the global level (World, US and Europe) reveals that Shari'ah compliant equity outperforms their conventional ones but maintains higher levels of risks (Al-Rifai, 2012; Lean and Parsva, 2012; Arouri et al. 2013, Jawadi et al. 2014).

Various studies further confirm that Islamic investments over-perform during bearish markets and underperform during bullish ones. This result was depicted by the performance of Malaysian Islamic mutual funds and unit trust funds (Abdullah et al. 2007), HSBC Islamic mutual funds from Saudi Arabia (Merdad et al. 2010), and Dow Jones and MSCI Islamic indices (Hassan and Girard, 2011) over the period from 1995 to 2001. Similarly, the relative risk performance of the Dow Jones Islamic index (DJIS) to the DJI Market World Index from 1995 to 2005 was significantly lower than the market basket of stocks (AL-Zoubi and Maghyereh, 2007). Additionally, Hoepner et al. (2011) find that six Islamic finance centres in Gulf Cooperation Council (GCC) countries and Malaysia perform better than international equity market. In Indonesia, the risk performance of the Jakarta Islamic stock index (JAKISL) was better than that for Jakarta Composite index (JCI) (Sukmana and Kolid, 2012). Aka (2009) find that the MSCI World Islamic index significantly outperform its conventional counterpart by over than 15% between 2004 and 2009.

This possibly can be explained by the characteristics of permissible Islamic investment which are previously mentioned in section 2.4. First, according to Hasan and Dridi (2010) and Al-Rifai (2012), Shari'ah principles and compliant screens protect Islamic banks and markets from financing and investing in the kind of instruments which are built on layers of debt and highly leveraged firms. Second, Islamic Investments have relatively avoided industries that were drastically affected by the trough and peeks of business cycles such as financial services, entertainment and media. They have been giving more investment weight to industries such as technology, oil and gas, and healthcare (Al-Rifai, 2012). This possibly leads to making their volatility levels lower in some markets as Aka (2009), and Sukmana and Kolid (2012) find Islamic investing is less prone to market swings, relative to conventional investment. The volatility argument presented in these studies is debatable. It may hold true given the period during which the research was conducted (before the global financial crisis). However, the oil sector is currently heavily affected by high oil price volatility. This raises a question regarding whether Islamic financial products would still be labeled as a low volatility alternative.

2.6 Diversification Benefits of Islamic Assets

When it comes to risk reduction and diversification benefits for Islamic assets, again empirical evidence is mixed. Arouri et al. (2013) perform a portfolio simulation in three major regions (the US, Europe and the World) using MSCI and FTSE Shari'ah equity indices. The identified investment weights given to Islamic assets indicated that investors reoriented their investments to such new financial products, indicating an increase in Islamic fund investment of 67% for Europe, 23% for the US and 138% for the World. They conclude that the enlarged portfolios lead to less systematic risk and generate more significant diversification benefits. Similarly, Jawadi et al. (2014) find that Islamic investments are riskier for the US and the world but, they provide higher returns for the Euro area during the 2001 to 2011 period. Al-Khazali et al. (2013) posit that Islamic indices dominate only in the European market. This was driven by the increasing linkage between Europe and the areas where the development of Islamic finance originated initially such as Qatar (Jawadi et al. 2014).

On the other hand, an analysis of Malaysian unit trust funds finds that both conventional and Islamic funds were unable to achieve at least 50 percent market diversification levels. However, conventional funds are found to have a marginally better diversification level than the Islamic funds (Abdullah et al. 2007). Meanwhile, the risk-adjusted returns and beta for Kuala Lumpur Shariah Index (KLSI) are lower than Kuala Lumpur Composite index (KLCI) in the short-run (Mansour and Bhatti, 2011). Equally, Hakim and Rashidan (2002) find that the conventional Wilshire 5000 (W5000) index risk-return characteristics are better than the Dow Jones Islamic Market (DJIM) index. In another study, Hayat and Kraussl (2011) compare the performance of Shari'ah compliant equity funds and conventional equity funds from the Malaysian market, Asia-Pacific, Europe and the Middle-East, and North America. They find that Shari'ah compliant equity fund underperformed compared to Islamic as well as the conventional equity benchmarks, especially during the recent financial crisis. They claim that the lack of hedging strategies in Islamic markets hinders their competitiveness. Also, they suggested that Islamic index tracking funds may offer better diversification benefits compared to Shari'ah compliant equity funds.

Moreover, Haasan and Girard (2011), Albaity and Mudor (2012), and Elfakhani and Kabir (2005) find similar reward to risk and diversification benefits between Islamic and conventional investments. According to Jawadi et al. (2014) and Hassan and Girard (2011), the correlation between Islamic and conventional markets is positive more specifically after the global financial crisis. Similarly, Ajmi et al. (2014) assure that Shari'ah compliant equity markets are not isolated from external shocks from different regions and that the Islamic finance system may not mitigate financial shocks affecting the conventional markets or provide large diversification benefits for portfolio managers.

There are two possible reasons for this expected underperformance or similar performance by Islamic markets. First, there is a linkage between Islamic and conventional markets in Europe and Asia, where Islamic markets are larger in terms of size but still lack hedging strategies (Ajmi et al. 2014). Second, the net returns may be negative, due to the incurred cost for screening investments based on Shari'ah standards Thus, the lack of diversification may outweigh the advantage of the low leverage level in Shari'ah compliant equity.

Regarding Islamic fixed-income securities, Sukuk (Islamic bonds) are found to provide diversification benefits for investors. This is proved by Cakir and Raei (2007) by using a sample of sovereign Sukuk and Eurobonds. They find that sovereign Sukuk reduce portfolio risk (VaR) in comparison with conventional sovereign bonds. Nonetheless, other research findings offer a different view about Sukuk and find that there is no noticeable difference from conventional bonds in terms of risk and return (Miller et al. 2007; Wilson, 2008). Also, Sukuk market is still a shallow secondary market where the transaction costs - as measured by bid-ask spreads - are much higher than conventional bond markets, because of the serious liquidity issues for Sukuk. This is due to the fact that Sukuk holders hold the contract until its maturity, instead of trading it in the market (Central Bank of Malaysia and Securities Commission Malaysia, 2009). This makes investors more exposed to liquidity risk and transparency risk. They will be unable to manage their portfolios in an efficient and cost effective way (Derigs and Marzban, 2008), and the ambiguity in the legal structuring of Sukuk can be problematic to Sukuk holders and may lead to disputes (El Alaoui et al. 2015). In this regard, there is a research gap when it comes to the performance of Shari'ah compliant investments. Most studies are comparative in nature. However, to my knowledge, there is no study which tried to utilise modern portfolio theory (Markowitz, 1952) and theory of neglect effect by Hong and Kacperczyk (2009), to find whether Shari'ah compliant equity can improve risk adjusted returns or not. Therefore, I hypothesise that:

H1: Shari'ah compliant equity ETFs improve the risk-adjusted returns of a portfolio comprising conventional emerging markets ETFs

H2: Shari'ah compliant equity ETFs can outweigh emerging markets fixed-income securities in the asset allocation, during periods of volatile interest rates.

2.7 Islamic Banks versus Conventional Banks

There is extensive empirical evidence regarding the difference in performance of Islamic banks and conventional banks. The literature under this point has two strands; one strand focuses on the difference in performance of Islamic and conventional banks in terms of their bank-specific characteristics and their effect on economic development and financial innovation. The second strand addresses the impact of economic stress and financial instability on Islamic banks. In general, the literature review about the performance of Islamic Banks in relation to conventional banks differs considerably across countries. This is due to the significant variation in the application of Shari'ah standards by Islamic banks across countries. Some Islamic banks follow the Islamic Financial Services Board (IFSB), others follow The Accounting and Auditing Organisation of Islamic Financial Institutions (AAOIFI), and the rest follow the central bank for the country where they operate.

For the first strand of literature, the effect of Islamic banks within and across countries has been dependent on bank-specific characteristics, cultural differences and regulatory limitations. Gheeraert and Weill (2015) find Islamic banking in general improves macroeconomic efficiency in 70 countries. Beck et al. (2013) contrast between Islamic banks and conventional banks in terms of business orientation, efficiency and stability in 141 countries over the period of 1995 to 2007. They find that: i) the business model of Islamic banks is similar to that of conventional banks, ii) the quality of Islamic banks' assets is higher because they invest in real economic activities, and iii) their market capitalisation is bigger. This makes them better off during financial crises and iv) Islamic banks are closer to insolvency than conventional banks. Neither study however, looked further into the variation cross-country, cross-Islamic banks' characteristics nor their effect on financial and economic development.

Empirical evidence about the efficiency of Islamic banks relative to conventional banks across countries is not conclusive. Abedifar et al. (2016) expand upon the earlier mentioned studies and compare the efficiency of Islamic banks and conventional banks in 22 Muslim majority countries based on their size (small, medium and large) over the period of 1999 to 2011. They study whether or not the coexistence of Islamic and conventional banks improves country's financial development in terms of economic growth, income inequality and reducing poverty. They find that there is a little relationship between the presence of Islamic banks of any size and economic growth. They also find a positive relationship between the market share of medium size Islamic banks and the mobility of funds, reduction in poverty, and credit allocation, whereas only large Islamic banks improve the efficiency of conventional banks.

The possible explanation for these findings is that small Islamic banks may not survive in environments of fierce banking competition (Katib and Kent, 2000; Weill 2011). Also, when an Islamic bank has not reached a sizeable market share, its effect is negligible. When medium size Islamic banks have bigger market share, their positive effect on the banking system's development happens through their transition. They expand their market share in the economy, improve their redistribution of profits from PLS projects to depositors and ease credit standards for borrowers and entrepreneurs. Also, Islamic banks cannot develop financial services unless they reach sizeable market share, or cooperate with other Islamic banks in a Shari'ah compliant sector. This financial innovation and development can empower Islamic banks competitiveness. However, when the market share of Islamic banks gets larger, large Islamic banks may become in an unfavorable position due to the competitive pressure from large Conventional banks.

Moreover, Wanke et al. (2016) compare between domestic and foreign Islamic and conventional banks' efficiency and financial distress in Malaysia. Malaysian domestic Islamic banks are found to be less efficient than domestic conventional banks, since they had significantly greater loss provision and expenses in relation to their assets, net profits, and equity. The higher expenses result from i) the enforcement of Shari'ah complaint screening by Islamic banks on financial products and services, and ii) the low leverage in the operations of domestic Islamic banks. Also, foreign banks - either Islamic banks or conventional banks - are less efficient than domestic banks, because of the existence of extreme cultural and regulatory limitations against them, which limit their efficiency. As I mentioned earlier, the inefficiency of foreign Islamic banks in Malaysia is due to the significant variation in the Islamic jurisdiction across countries and different social traditions. This greatly affects the Islamic guidelines in relation to the leverage and profit and loss ratios, which Islamic banks should enforce in their financial services and operations. In addition, the weak performance of IBs in some countries such as Qatar, Turkey, and the UAE is associated with "sector concentration"; where they focus on investing in certain sectors such as the real estate and construction sectors (Abedifar et al. 2016). This implies that Islamic banks are more exposed to systematic components of risk. Also, Islamic banks' inefficiency is associated with "name concentration"; as having either a small portfolio or an exposure to specific individuals, like what happened with Global Finance House in Dubai and their relatively large provisions for real estate projects. This happens as a result of the economic structure in Middle Eastern countries, where there is significant state intervention in banking operations distress (Mizaei et al. 2013).

For the second strand of literature, previous research focuses on the effect of economic stress, financial instability and market risk on Islamic banks. Overall, Islamic banks are found to be negatively affected by the economic state and financial instability of financial systems. Sorwar et al. (2016) adopt a top-down approach to investigate the effect of market's systemic risk on portfolios of Islamic and conventional banks, by considering the capital structure of both types. They use Value at Risk (VaR) and Expected Shortfall (ES) measures to measure market's systemic risk. Their analysis covers 20 countries, and they find that the market has an equal effect on Islamic and conventional banks. They also find that during the financial crisis, Islamic banks are less risky than conventional banks. This is due to the different capital structure of Islamic banks compared to their conventional peers, and the lower dependence on leverage by the former. This implies that traditional capital structure models may be "unfair" to Islamic banks, because they include many proxies for debt financing and might magnify the leverage levels in Islamic banks.

Further, Cihak and Hesse (2010) analyse the financial stability of conventional banks and

Islamic banks in terms of their probability of failure in 18 countries. They find that small Islamic banks are financially stronger than small conventional banks, while large conventional banks are financially stronger than large Islamic banks. This is due to the better theoretical capacity of Islamic banks for handling economic stress according to Khan (1991) and Beck et al. (2013). However, a recent study by Bourkhis and Nabi (2013) disagree with this proposition. They suggest that financial distress has an equal impact on both conventional and Islamic banks and there is no significant difference in their financial stability.

It is important to understand the role of Islamic banks' specific risks and the spillover effects of their financial distress on the systemic risk. In fact, numerous studies on financial liberalisation have pointed out the relevance of bank competition to financial stability (Blackburn and Forgues-Puccio, 2010; Manlagñit, 2011). Djennas (2016) assesses the efficiency of Islamic finance in an entire banking system in eight Islamic countries and six newly industrialised countries. He finds that some of the countries, which apply Islamic finance principles, may be unable to access financing sources. Beck et al. (2013) and Olson and Zoubi (2008) find that Islamic banks' preclusion of leverage hinders them from achieving similar profitability levels compared to conventional banks. Islamic banks have to be either involved in risky projects with high return or fail to compete in the market.

This again draws my attention to the viability of the Islamic banking sector and its functionality in the conventional financial system. That is said, I hypothesise that:

H1: Islamic banks' financial distress affects other financial institutions and has spillover effect in financial systems

H2: Islamic banks are relevant to the financial system and contribute to its systemic risk.

H3: There is a time-variability in the effect of Islamic banks on the system due to the variation in their business performance and bank-level characteristics.

2.8 Research Philosophy

In finance, a theory is a well-proved assumption about the economy or financial markets. Theories are usually based on confirmed evidence or facts produced by experiments and/or analysis data. Theory must be based on proof and validation, and should allow people to validate it. The process of validating a theory by doing research differs considerably based on the way the researcher tries to find answers for a given research question.

There are three main research philosophies a researcher can follow. First, positivism directs the researcher to derive information in a logical and measurable way, rather than by deducing subjectively through impression, perception or reflection (Remenyi, 1998). Reality or the subject under consideration in positivism is regarded in an objective and singular way. The researcher does not affect the research subject, and the research subject does not affect the researcher (Orlikowski and Baroudi, 1991). According to Burrell and Morgan (1979), when a researcher follow a positivistic approach, he/she seeks to explain and predict what happens in the social world by searching for regularities and causal relationships between its components. The end result of the positivistic research can be generalised to similar social realities, if another researcher use similar quantifiable observations and same statistical analysis (Remenyi, 1998). Positivism is better dealt with through quantitative methods. Second, the philosophy of critical realism shares a lot of common foundations/principles with positivism. The researcher believes that reality exists and independent to any perceptions or impressions. Realism also assumes that the universe is composed of empirical independent entities regardless of the observer's appreciation of them (Goles and Hirschheim, 2000).

Third, interpretivism argues that reality is not known and the researcher should investigate the details of the situation in order to understand what reality is. Under this philosophy, reality or a particular situation can be interpreted differently by people. Interpretation is dependent on their perceptions and reflections, because situations are complex and unique to a particular set of circumstances and individuals. Therefore, the research which follows interpretivism tries to understand motives, actions and intentions of other people to derive a social construct (Burrell and Morgan, 1979). Interpretivism is better dealt with through qualitative methods.

In this research, I test concepts such as diversification, by utilising Shari'ah compliant equity ETFs in an emerging market portfolio. This is driven by Modern Portfolio Theory (MPT) proposed by Markowtz (1952), which argues that the larger the number of assets used in the allocation of wealth the better the return and risk of the investment portfolio. I also examine an econometric concept called "financial distress" -measures as marginal Conditional Value at Risk ΔCoVaR)- proposed by Adrian and Brunnermier (2011), which assumes that an institution can become financially distressed and have spillover effects on other institutions when it exceeds its standard level of Value at Risk (VaR). These concepts are positivist in the sense that, I will use quantitative analysis to validate these concepts. Additionally, I collect financial data such as daily returns, total assets, total debts and total equity and macroeconomic data such as interbank rates, treasury-bill rates, budget surplus/deficit and foreign currency reserve. I collect such data from financial statements and financial databases. Therefore, the epistemological assumption I will follow in this research is positivism. This choice is guided by my research questions, data availability, and hypotheses to be tested to answer the research questions.

Given the nature of my research, I will follow the deductivist approach by Popper (2005). Deductive research is most appropriate for this thesis, because it allows me to solve the research problem by reviewing the literature and deducing hypotheses which are tested through estimation models. The estimation models are analysed using econometric measurements to derive the research findings. Then I will be able to confirm whether the research findings confirm or reject the research hypotheses (Bryman and Bell, 2015; Saunders et al. 2009). The advantage of this approach is, it ensures objectivity and reliability by using quantitative methods (Kuhn, 1962). Also, quantitative researcher is considered external to the research subject and his/her results can be replicated regardless of who conducts the research (Weerd-Nederhof, 2001).

2.9 Conclusion

In this chapter, I demonstrated the theories which related between religion and economics and the empirical evidence which supported or falsified these theories. I provided an explanation for the key characteristics of the Islamic economic framework, the performance of Shari'ah compliant investments relative to conventional investments and the key differences between Islamic banks and conventional banks. Chapter 3 contribution to the previous literature is twofold. First, I will estimate and evaluate the riskiness of a portfolio which has a mixture of three asset classes: conventional equity, conventional fixed income, and Islamic equity. Previous studies only compared conventional equity to Islamic equity or bonds to Islamic Sukuk. Standard finance theory suggests that the inherited risk in fixed-income securities is usually less than any form of equity. Nonetheless, Islamic scholars claim that the relative absence of interest rates in financing businesses makes Islamic assets less risky and more resilient in market downturns. I will address this argument by testing whether or not Islamic equity can out-perform EM fixed-income securities. Second, my chapter contributes to the wider literature in asset allocation and portfolio optimisation by investigating Islamic assets' performance using dynamic asset allocation strategies.

Chapter 4 contributes to the literature about the Islamic banks' financial instability in two ways. First, I will examine the effect of Islamic banks' financial distress on other financial institutions, by jointly considering their own specific characteristics, macroeconomic variables and market structure. Second, given the lack of research in identifying the role of Islamic banks in decreasing/increasing financial stability, I will examine the systemic risk relevance of Islamic banks on the financial system in terms of realised systemic risk. I will investigate further if there is a time-variability in Islamic banks' effect on the system, due to their own specific characteristics.

Chapter 3: Diversification Benefits of Islamic ETFs in Emerging Markets

3.1 Introduction

In the aftermath of the recent financial crisis 2008-09, there has been an increased academic interest in the performance of Islamic financial assets and their use as a hedging instrument during financial downturns. Prior literature shows mixed evidence about whether or not the characteristics[4] of Islamic assets can potentially lead to a risk reduction when incorporated within a portfolio of conventional assets (e.g. Cakir and Raei 2007; Arouri et al. 2013; Jawadi et al. 2014). Also, existing empirical studies focus on Islamic assets' diversification benefits in developed markets (Europe, US and the world) (e.g. Ajmi et al. 2014; Saiti et al. 2014). This research contributes to the literature by empirically testing the diversification effect from adding Shari'ah compliant equity to a portfolio which contains a broad range of emerging market assets for the period 2009 to 2015. This has not been investigated so far.

Two important questions should be answered to explain the rationale behind this research. First, why would one focus on emerging markets? In recent years, emerging markets have been suffering from a significant economic turbulence. This is due to crises coming from advanced economies such as quantitative easing, the European debt crisis and the large withdrawals of foreign capital which have a considerable effect on emerging markets' stability (Kose et al. 2006; Moshirian, 2008). The issue I posit here is showcasing the diversi-

[4] Some of the most important characteristics of Islamic assets are (i) the sharing of risk and profit by all contractual parties, (ii) the avoidance of any excessive uncertainty as all contract terms should be known to all parties involved in the agreement, and, (iii) the whole transaction is not interest-based.

fication benefits of Shari'ah compliant equity ETFs. The reason driving the association between Shari'ah compliant equity ETFs and emerging markets is, Shari'ah compliant equity can be a good option to consider in the asset allocation, because preliminary analysis show that they are weakly correlated with emerging markets' ETFs. As Wang and Nguyen (2013) suggest, it is important to select diversified portfolios during financial crises and periods of high volatility as contagion risk tends to be strongly prevalent.

Second, why, would one care about the role of Shari'ah compliant equity in enhancing the risk-return profile of an emerging market portfolio? Emerging markets have been posting increased correlations/co-movements in their returns (Balakrishnan et al. 2011) for some decades now courtesy of globalization (Stulz, 2005). Hence investing in Islamic (and ethical investments in general) may help reduce this correlation.

It is important to note that the selected Islamic ETFs are Islamic in practice, not origin, so basically they invest in selected portfolios of shares that adhere to certain rules "Shari'ah percepts". The selected ETFs are not related to majority Muslim countries- which are mostly emerging markets- but track Islamic indices. The indices comprise businesses which comply with Shari'ah. The ETFs included mimic the allocation of MSCI emerging markets Islamic index, MSCI US Islamic index and MSCI world Islamic index. The constituents for the emerging market index and the equity's origin are not focused on one region like MENA, Latin or Asia pacific.

Thus, this portfolio exercise is a mix of styles (emerging markets and Shari'ah compliant equity investments) brought together to investigate the diversification benefits of Shari'ah compliant equity.

This study is of interest to institutional investors who combine two styles "emerging markets" and "Islamic funds" in a single portfolio, to minimise its risk in the long-run. According to various theoretical propositions, Islamic assets' features can potentially lead to a risk reduction when incorporated within conventional assets' portfolios (Al-Rifai, 2012). However, at the empirical level the evidence is rather mixed. Many studies report Islamic assets exhibit increased resilience during market downturns (Arouri et al. 2013; Jawadi et al. 2014). Other studies such as Hayat and Krauessl (2011) find contradictory findings, where Islamic assets do not seem to have any diversification benefits.

This research has two main contributions to the literature. Firstly, the portfolio under examination will have a mixture of three asset classes: conventional equity, conventional fixed income, and Shari'ah compliant equity. Previous research only compared conventional equity to Shari'ah compliant equity (Jawadi et al. 2014), or bonds to Sukuk (Islamic Bonds) (Cakir and Raei, 2007). I am aware that technically fixed-income securities are safer investments than any equity. However, Islamic scholars claim that the relative absence of interest rates in financing businesses makes them less risky and more resilient in market downturns. So, it will be interesting to decide whether or not Islamic equity can over-perform emerging markets fixed-income securities.

Secondly, I will investigate the earlier mentioned question, by using the symmetric dynamic mean-variance and the asymmetric dynamic mean-variance strategies. The first strategy incorporates the time-variability in correlations based on the symmetric Dynamic Conditional Correlation (DCC) model as explained in Engle and Colacito (2006). The second strategy incorporates the asymmetry in correlations based on the Asymmetric Dynamic Conditional Correlation (A-DCC) model by Sheppard (2002). Both dynamic strategies will be compared to the static mean-variance strategy by Markowitz (1952). Portfolio performance evaluation will be conducted for both strategies, to find which strategy results in better portfolio performance.

The results suggest that Shari'ah compliant equity ETFs lead to a better portfolio performance and risk-adjusted returns across all samples. This indicates that Shari'ah compliant equity ETFs lead to a risk reduction. The modified-Sharpe ratio for all portfolios consisting of Shari'ah compliant equity ETFs is higher than those for portfolios without them. The results are in line with those of Arouri et al. (2013) who show that investors across different regions reorient their asset allocation to include more Islamic assets in their portfolios. Also, Shari'ah compliant equity ETFs receive more weight than conventional EM fixed income ETFs in the estimated optimal portfolio after the out-of-sample period. This again confirms that Shari'ah compliant equity ETFs have a positive effect on the portfolio's diversification. This can possibly be attributed to the i) the lower risk of Shari'ah compliant equity ETFs during this period; as well as, ii) the increased volatility of the fixed-income markets driven by excessive speculation on the possible increase of the FED's rate in the early 2013. The findings suggest that institutional investors would find Shari'ah compliant equity ETFs less sensitive to the turbulence in financial markets; hence, they are important in stabilizing an emerging market portfolio.

Furthermore, dynamic strategies generate higher returns when portfolios are monthly re-balanced in the in-sample period. This is attributed to the market recovery with high market volatility during the end of the US financial crisis in the first half of 2009, and the escalation of the European debt crisis in 2011.[5] It further confirms prior studies suggesting that time varying variances and time varying correlations between assets are higher and more favoured during turmoil period than tranquil periods (Longin and Solnik 2001). Therefore, the approach in rebalancing the asset portfolio each period is the most appropriate so as to adjust the asset allocation to the new information reflected on the time-varying covariance matrix.

In the next section, I will demonstrate the theoretical background and the findings of the relevant literature about emerging markets characteristics, the performance of Shari'ah compliant equity ETFs, and the performance of dynamic versus static portfolio management strategies.

[5] This finding corroborates with Alexeev and Dungey's (2015) study on conditional correlation during bear and bull markets who report a steady rise in average conditional correlation during the first half of 2009 and the Greece debt crisis in 2010 and 2011.

3.2 Literature Review

Emerging markets have received considerable attention in theory and practice. However, discussing their nature and contemporary challenges is essential for supporting the intuition of this study. Emerging markets can be defined as the markets with fast economic growth, and continuous development in their regulatory bodies and market exchanges. They have two prevailing characteristics in the pertinent literature. First, emerging markets' swings are dramatic, where their highs are pleasurable and lucrative, their lows are painful and slip your money away. De Santis and Imrohoroglu (1997) show emerging markets' volatility is considerably higher than developed markets, both at the conditional and the unconditional levels. Hanna et al. (2001) find the Istanbul stock exchange in particular exhibits more than twice the volatility of a developed market such as the German stock market. These high volatility levels make emerging markets not attractive to investors with high risk-aversion, and make them less willing to invest in them (Stevenson, 2001). Therefore, it is important to investigate here if a hybrid style of emergind markets and Islamic funds would benefit Institutional investors and reduce portfolio's risk level.

Second, emerging markets cannot hide from regional or global financial turbulence due to financial integration. In this regard, Park and Mercado (2014) study the causes of financial stress in emerging markets. They find shocks from developed and other emerging countries cause the same impact or more on the domestic financial stress as a regional shock. However, most emerging Asian markets are more vulnerable to regional shocks than shocks from developed and other emerging markets. For example, the Asian financial crisis in 1997 left many financial institutions insolvent in Far East Asia, after they used to borrow from abroad to finance real estate and equity investment. What makes the story worse; the Thai government for example decided to not support or bail out such institutions. They also failed to stop speculative attacks on the Thai Baht which resulted in a fall in its value by 20%. Similar markets were not safe from these attacks. In 1998, the Russian Ruble collapsed and the government imposed restrictions on capital flows into and out of the country and rescheduled domestic debt. This led to the loss of a 100 billion US Long Term Capital Management (LTCM) hedge fund. In 1999, the same happened in Brazil, but this time the collapse in the currency and the rapid capital outflow were due to the reckless political and economic decisions regarding debt payments and real interest rate.

More recently, the empirical evidence realise the aftermath of the recent financial crisis 2008-09, and the negative effects it left on emerging markets (Aizenman and Pasricha, 2010; Balakrishnan et al. 2011; Dovern and Van Roye, 2013). Reasons include the dramatic fall of international trade, excessive dependence on foreign financing, currency devaluation, freezing credit markets and the Fed’s asset repurchase programmes. This led to an increased financial stress, and investors withdrew billions of dollars from emerging markets’ equity funds.

3.2.1 Islamic Assets, Emerging Markets and Financial Crises

In the previous section, I showed how emerging markets' assets are sensitive to changing global economic and financial conditions due to financial integration. In this section, I will discuss how Islamic assets' performed during market downturns. In particular, I will focus on the relevant literature about whether or not other asset classes such as Islamic assets may provide diversification advantage for emerging markets' investors. Various theoretical propositions state that Islamic assets' characteristics can potentially lead to a risk reduction and can be used as a hedging instrument during financial downturns when incorporated within a portfolio of conventional assets (Cakir and Raei, 2007; Arouri et al. 2013; Jawadi et al. 2014). At the empirical level, evidence is rather mixed. In emerging markets, empirical evidence provides findings about the performance of individual Islamic assets or markets, but Shari'ah compliant equity ETFs' diversification benefit in emerging markets' portfolios is not sufficiently addressed. Dharani and Natarajan (2011) find no difference between the performance of the Nifty Shariah index and the Nifty index in India. Ho et al. (2013) compare the effect of the dotcom and global financial crises on Islamic and conventional indices from developed markets (US, UK, France, Switzerland, Hong Kong) and emerging markets (India, Malaysia and Indonesia). Their results show that Islamic indices are less drastically affected by the crises than conventional indices. In addition, Hoepner et al. (2011) find GCC and Malaysia Islamic financial centres outperformed international equity markets.[6]

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[6] Islamic finance products can possibly offer diversification benefits because much of Islamic finance is undertaken in frontier markets which include markets of rather limited integration with the rest of the worlds. However, not all Islamic finance products are launched or traded in frontier markets.

On the global level, Arouri et al. (2013) use portfolio simulation in three major regions (US, Europe and the World), represented by MSCI and FTSE equity indices from 2006 to 2008. They find investors' appetite to invest in Islamic assets increased after the global financial crisis. In particular, optimal investment proportions in Islamic assets increased by 67 percent for Europe, 23 percent for the US and 138 percent for the World. As the authors propose, these new portfolios reduce the exposure to systematic risk while generating more economically significant diversification benefits. This can be explained by the limited correlation between Islamic financial assets as mentioned earlier. In terms of returns, Dow Jones Islamic indices appear to outperform conventional ones especially during the period of the financial crisis across the Euro region. They argue that this is driven by the increasing linkage between Europe and areas where the development of Islamic finance initially originated in countries such as Qatar.[7]

In a similar manner, Cakir and Raei (2007) report an increased diversification advantage for investors using Islamic bonds (Sukuk) by showing that the inclusion of these bonds in a portfolio of conventional fixed income securities (Eurobonds) reduces significantly the Value at Risk (VaR) of the portfolio. Three common reasons in the literature justify this relative outperformance of Islamic assets. These include their lower volatility, and systematic risk component, which make them less prone to market swings (Aka, 2009; Sukmana and Kolid, 2012). Furthermore, the principle of profit-and-loss sharing of Islamic finance

[7] This was in line with previous studies such as that of Al-Khazali et al. (2013) who argue that Islamic indices dominate only in the European market.

(Al-Zoubi and Maghyereh, 2007), and investing in productive industries with real economic value-added, such as technology, oil and gas, and the healthcare (Al-Rifai, 2012).

On the other hand, various studies find Islamic investments either underperform during bearish market conditions or have similar reward-to-risk and diversification benefits relative to their conventional peers (Elfakhani et al. 2005; Hassan and Girard, 2011; Hayat and Krauessl, 2011; Albaity and Mudor, 2012). Two possible explanations for such results are provided by Bauer et al. (2006) and Hayat and Krauessl (2011). These are (i) the lack of diversification potential given that ethical portfolios should be viewed as a subset of the market portfolio, and (ii) the possible negative impact on the portfolio performance due to the extra costs incurred by selecting and monitoring stocks according to ethical screening. Also, the positive correlation between Islamic and conventional markets led to similar performance especially after the global financial crisis (Hassan and Girard, 2011; Jawadi et al. 2014). In this regard, Ajmi et al. (2014, p.225) claim that the Islamic equity market should not be perceived as being isolated from external shocks across different types, regions and sources given that the Islamic financial system probably cannot mitigate financial shocks affecting conventional markets globally.

In general, Islamic assets have different performance independently or within portfolios across different markets and time periods. However, it is interesting to find whether or not they will have any potential benefits when they are added to an emerging markets' portfolio. Therefore, I hypothesise that:

H1: Shari'ah compliant equity ETFs improve the risk-adjusted returns of a portfolio comprising conventional emerging markets ETFs

In addition, there is a research gap here, since no research to my knowledge investigated whether Shari'ah compliant equity can be a better option relative to conventional fixed-income securities. Thus, the second hypothesis I test in this research is:

H2: Shari'ah compliant equity ETFs can outweigh emerging markets fixed-income securities in the asset allocation, during periods of volatile interest rates.

3.2.2 Portfolio Management

Hicks (1935) propose the theory of investment which states if investing only a proportion of total assets in risky enterprises, and investing the remainder in ways which are considered more safe, it will be possible for the individual to adjust his whole risk situation to that which he most prefers, more closely than he could do by investing in any single enterprise. Hicks (1935) was a frontrunner of Tobin (1958) and Markowitz (1952) in seeking to explain the demand for money as a consequence of the investor's desire for low risk as well as high return. But he did not designate standard deviation or any other specific measure of dispersion as representing risk for the analysis. Also, he did not distinguish between efficient and inefficient portfolios, did not show any drawing of an efficient frontier and did not know about any theorem to the effect that all efficient portfolios that include cash have the same proportions among risky assets.

In the classical Modern Portfolio Theory (MPT) by Markowitz (1952), the investor is assumed to reduce risk through portfolio diversification, subject to a required rate of return. It established that there is a risk reduction benefit through portfolio diversification with little or no negative impact on return. In relation to deciding how much wealth should be invested in monetary assets, Tobin (1958) provide an improved theory of holding of cash "monetary assets" marketable fixed in money value, free of default risk. His theory assumed that investors seek mean-variance efficient combination of monetary assets using the expected return and standard deviation as criteria. He also assumes that that the risk for monetary assets is market risk not default risk. Similarly, Hicks (1962) assumes that all correlations are zero and present the general formula for portfolio variance written in terms of correlations, rather than covariance matrix. Hicks (1962) also derive from the Tobin conclusion that among portfolios that include cash, there is a linear relationship between portfolios mean and standard deviation and that the propositions among risky assets remain constant along this linear portion of the efficient frontier. In the next section, I will demonstrate the different portfolio management strategies based on the aforementioned theories.

3.2.3 The Naive (Mean-Variance) Strategy

Mean-variance strategy addresses an investor who estimates the expected returns and the covariance matrix using sample mean and variance over the estimation period and holds these parameter estimates constant over the allocation period. Interestingly, many studies show that simple strategies such as 1/N rule[8] and mean-variance can result in better portfolio performance. The first study about the 1/N rule is considered Brown (1976). There have been many arguments that this strategy can outperform more sophisticated ones due to estimation errors. Jobson and Korkie (1980) say that such naive rule can outperform the Markowitz rule. Similar results are found by Duchin and Levy (2009).

DeMiguel et al. (2009) compare 1/N rule by many sophisticated extensions of the Markowitz rule, and argue that none of the strategies in the literature outperforms the naive strategy in

8 The 1/N strategy is a simple rule used by Markowitz (1952), which allocates portfolio weight equally across all N funds under consideration.

terms of out-of-sample Sharpe ratio. In this regard, DeMiguel et al. (2009) and Tu and Zhou (2011) claim to develop portfolio strategies achieving consistently higher Sharpe ratios than 1/N, but Tu and Zhou (2011) results are without statistical implications. Also, Behr et al. (2013) and Fletcher (2009) examine a broad range of minimum-variance portfolios against the findings by DeMiguel et al. (2009) and find that there is no established portfolio strategy which outperforms 1/N rule significantly.

I should note that Behr et al. (2013)[9] develop a minimum-variance portfolio strategy with flexible weight constraints, and compare its performance to 1/N rule. They find that their strategy outperforms 1/N rule with consistently increased Sharpe ratio, and low turnover.

However, in light of emerging markets' increased volatility, asymmetric returns and time-varying correlations (Claessens et al. 1995; Bekaert et al. 1998; Stevenson, 2001), there is a growing consensus recognising the drawbacks of mean-variance strategy. It is a static diversification strategy which may lead to considerable underperformance.

[9] See Behr et al. (2013) for details about the weight-constrained minimum variance portfolio strategy they developed.

3.2.4 Dynamic Strategies

This has encouraged the development of new portfolio strategies, which does not necessarily provide good out-of sample performance, but there have been trials by many researchers to offer better results.

Emerging markets suffer from financial contagion which is addressed by previous studies like Calvo and Reinhart, (1996), Dornbusch et al. (2000), Kaminsky and Reinhart (1999, 2000) and Moser (2003). Contagion can be defined as the co-movement between financial asset prices and capital flows when economies share similar fundamentals, and are strongly interdependent in terms of international trade and financing. Such similarity triggers comparable response when a shock happens among markets. As a result, the variation in correlations has been widely found to be positive and stronger in the variance of asset returns, which may lead to undesirable portfolio losses.[10] Engle and Colacito (2006) argue that correlation accuracy increases the efficiency of mean-variance portfolios, and it is costly to assume constant correlation during volatile correlation phases.

In my knowledge, empirical research has largely focused on estimating conditional correlations in different markets, but less attention has been given to the shocks persistence in emerging markets. Longin and Solnik (2001) find that in bear markets, correlations tend to increase. Ang and Bekaert (2002) find high correlations are linked to higher volatility in the

[10] Emerging markets have been through an evolutionary trajectory over the years that have allowed them to integrate deeply within the international financial architecture. This justifies the high correlations between them and global markets.

US, UK and Germany, which coincide with a bear market and refute the benefits of international diversification. Lastly, Cappiello et al. (2006) find support for asymmetry in the correlations of international equity and bond returns. Accordingly, the Dynamic Conditional Correlation (DCC) Model and Asymmetric Dynamic Conditional Correlation (A-DCC) model have been proposed. These models consider time-varying information in the returns of individual assets unlike the univariate models which use information already synthesised in the portfolio returns (Engle, 2002). Mean-variance strategy assumes constant correlations between assets overtime, while DCC assumes that correlations between assets change over time.

In this research, I use a dynamic strategy -DCC in particular-, because Engle and Sheppard (2001) find that DCC model outperforms the industry standard Risk Metrics exponential smoother, because they provide better predictability in terms of residual normality and lower portfolio standard deviations. Engle and Colacito (2006, p. 293) state that it is significantly important to estimate the time-varying variance covariance matrix, especially when the assets are highly correlated. Though, using dynamic correlations leads to increasing the required return for portfolios, because they result in more accurate information, unlike volatility timing strategies

In an investigation of the effect of returns' non-normality on portfolio optimisation from the perspective of an unhedged US investor, Jondeau and Rockinger (2012), compare three strategies: dynamic higher moments, dynamic mean-variance and the naive mean-variance using weekly data of major stock market indices from the Unites States (US), the (UK), Germany, Japan, and France. They find that dynamic mean-variance strategy performed better than the naive mean-variance. In addition, Kalotychou et al. (2014) examine the profitability of using a dynamic asset allocation strategy by predicting time-varying correlation between domestic sector portfolio in three markets (US, UK, and Japan), over three periods (1996:2012, pre-crisis 2005:2007, during crisis 2007:2009, post-crisis 2009:2012). Their research motivation is driven by the fact that the simple sector correlations over the same period were significantly positive. The analysis follows active asset allocation strategy by the recursive construction of optimal mean-variance portfolio in the three markets based on incremental utility and risk-adjusted returns.

In order to estimate the covariance matrix used in the portfolio optimisation, they estimate the conditional correlation afterwards using the DCC model, and A-DCC model. The DCC model turns out to be the most parsimonious model. In comparison with static mean-variance strategies, they find dynamic asset allocation strategies deliver more performance gains in all markets because of the increased Sharpe ratio. Dynamic correlation models also forecast covariance matrix more accurately, since their efficient frontiers lie above that for the static strategy.

Furthermore, the researchers evaluate both strategies based on the annualised performance fees. It was revealed that investors are willing to pay higher performance fees in all three markets to switch from the static to the dynamic strategy and capture the asymmetric effects in correlations and structural breaks. It is important to note that lower rebalancing frequency is essential if daily traders engage in dynamic correlation strategies, because higher turnover can be very costly. However, Jondeau and Rockinger (2012) and Kalotychou et al. (2014) focus solely on developed markets. This implies that their results may not be generalised on other markets like emerging markets as in my research.

In this study, I will use the Dynamic mean-variance framework with dynamic conditional correlations by Engle (2002) and Engle Colacito (2006). My contribution to the literature is examining whether or not conditional correlation in dynamic mean-variance optimisation is beneficial for emerging markets investors.

Accordingly, I hypothesise that:

H3: Dynamic allocation strategy outperforms static allocation strategy in emerging markets during crises periods.

Considering asset allocation with Islamic assets, recent studies have been advanced from simple mean-variance strategy (Arouri et al. 2013) to using more sophisticated models such as the DCC model. For example, Saiti et al. (2014) study the diversification benefits of Islamic assets for a US based investor by considering international market integration and the time variability in correlations. They use MSCI conventional and Islamic stock indices from: (Malaysia, Indonesia, Turkey, GCC region ex-Saudi Arabia) and Far East (Japan, China, Korea, and Hong Kong, Taiwan) countries. Then, they compare them with the MSCI conventional index of US. They estimated the conditional volatilities using the GJR-GARCH model to estimate the time-varying correlation matrix. In general, the researchers find the correlations between conventional US MSCI index and other conventional markets are more or less similar to those of the Islamic markets. More specifically, there is a high correlation between US conventional MSCI index and Turkey, China and Hong Kong Islamic MSCI indices, there is relatively less correlation between the US conventional MSCI index and the GCC ex-Saudi and Japan Islamic indices.

Although Saiti et al. (2014) try to present new findings in this area; they conclude that Islamic markets do not offer any extraordinary diversification opportunities to the US-based investors without any allocation strategy. Also, the research background is built on a conceptually misleading information by reporting evidence on the co-integration between Islamic stock markets and developed markets (Marashdeh, 2005; Bley and Chen, 2006; Majid et al. 2007; Majid and Kassim, 2010). Co-integration happens when the difference between markets or financial assets' movements is fixed over time. This means that co-integration cannot tell whether or not markets' movement move in a similar direction. Thus it is not statistically valid to imply that there are diversification benefits when markets are less or not co-integrated.

3.3 Research Data

The research data consists of 17 exchange traded funds (ETFs) which are traded in three of the largest international markets (the United Kingdom, the United States, and Germany).

Table 1 –Chapter 3 Research Data

	Ticker	ETF	Additional Information
General Equity EM	EEM:US	MSCI Emerging Markets	Tracks the MSCI TR emerging markets index, No Distributions. Inception 11/04/2003.
	VWO:US	FTSE Emerging Markets	Tracks the FTSE emerging markets index. Inception 10/03/2005.
	GMM:US	S&P Emerging Markets	Tracks the S&P emerging BMI index. Inception 23/03/2007.
	IEEM:LN	MSCI Emerging Markets	Tracks the MSCI emerging markets index, distributes income to shareholders. Inception 21/11/2005.
	EWX:US	Emerging Markets Small Cap	Tracks the S&P emerging markets under USD2 Billion index. Inception 16/05/2008.
Regional Equity EM	GMF:US	Emerging Asia Pacific	Tracks the S&P Asia Pacific emerging BMI index. Inception 23/03/2007.
	GAF:US	Emerging Middle East & Africa	Tracks the S&P Mid-East and Africa BMI index. Inception 23/03/2007.
	GUR:US	Emerging Europe	Tracks the S&P European emerging BMI Capped index. Inception 23/03/2007
	GML:US	Emerging Latin America ETF	Tracks the S&P Latin America BMI index. Inception 23/03/2007.
Fixed Income In EM Traded in US and UK	EMB:UD	Emerging Markets Bond (FINRA ADF**)**	Tracks J.P. Morgan EMBI Global Core index, Follows FINRA authority and automated system. Established on 15/02/2008. Invest in government and quasi-government bonds grade and high yield bonds.
	EMB:UT	Emerging Markets Bond (NASDAQ Intermarket)	Tracks J.P. Morgan EMBI Global Core index, traded in NASDAQ. Established on 05/07/2008. Invest in corporate bonds across sectors (industrials, utilities and financial companies) as well as in quasi-government bonds.
	EMB:US	Emerging Markets Bond (NYSE)	Tracks the J.P. Morgan EMBI Global Core index, traded in NYSE, Established on 19/12/2007. Invest in government and quasi-government bonds grade and high yield bonds.
	EEMB:LN	Emerging Markets Bond (for UK and Ireland Investors Only)	Tracks the J.P. Morgan Emerging Markets Bond Index Global Core Index. Inception 07/04/2008. Open only to investors from UK and Ireland unlike EMB: US, UT and UD.

The table shows the ETFs I use in my sample categorized by their investment style (Conventional/Islamic) and asset class. It shows also, the ticker name and information for each ETF.
LN: London Stock Exchange, GR: Germany Stock Exchange

Table 2 –Chapter 3 Research Data (Continued)			
Shari'ah compliant equity from World, USA and EM	ISDW:LN	World Shari'ah compliant equity	Tracks the MSCI World Islamic index. Distributes income to shareholders
	ISDU:LN	USA Shari'ah compliant equity	Tracks the MSCI USA Islamic index. Distributes income to shareholders
	ISDE:LN	Emerging Markets Shari'ah compliant equity Traded in London	Tracks the MSCI Emerging Markets Islamic Index. Inception 10/12/2007 and traded in London
	IUSE:GR	Emerging Markets Shari'ah compliant equity Traded in Germany	Tracks the MSCI Emerging Markets Islamic Index. Inception 25/03/2008 and traded in Germany

Studies such as Jondeau and Rockinger (2012), Saiti et al, (2014), and Kalotychou et al. (2014) use indices in investigating asset allocation. I use ETFs instead of indices because it is intuitive that you cannot trade indices but you can trade ETFs when it comes to trading. ETFs are a combination of open-end and close-end funds combining the advantages of both types of funds into one product. More specifically, an ETF is a fund, investing in a basket of stocks, whose aim is to replicate a benchmark index; nevertheless, it can be traded as a stock itself. The key feature which makes us use the ETFs is risk diversification and liquidity. Curcio et al. (2004) suggest that ETFs can be attractable to retail investors, who are the main target of my study.

The ETFs focus on three asset classes: conventional equity, conventional fixed-income securities, and Shari'ah compliant equity. My selection of the data was constrained with its availability. Though, after extensive search, I found ETFs which track the performance of major indices such as MSCI, FTSE, S&P and JP Morgan. This will provide rigorous findings.

I obtain the daily close price for the ETFs shown in the table above from 02/09/2009 to 23/10/2015 with no missing observations. The research methodology will be applied on the full sample and two subsamples, to check if the results will significantly change. I divide the full sample into two subsamples in order to avoid in-sample overfitting and spurious results. The first sample is the estimation period from 2-1-2009 to 3-5-2012 (869 observations), where I will fit the DCC models to the data. The second sample is the allocation period from 4-5-2012 to 23-10-2015 (898 observations), where I will forecast 898 observations ahead.[11]

All historical prices obtained from Bloomberg terminal are adjusted to reflect abnormal cash changes and capital changes. Most ETF dominated currency is USD; however few are traded in different markets and dominated in Euro or Pound Sterling. In order to unify the currency base for all ETFs, non-USD ETFs' closing prices were multiplied by the daily (GBP/USD) and (EUR/USD) exchange rates. The daily logarithmic returns are used in this research.

Again, the investor I am targeting in this study does not need risk free assets in the asset allocation, because risk-free rates are less important here due to the fact that part of the portfolio is fixed-income in orientation (courtesy of the inclusion of fixed income ETFs).

[11] Out-of-sample estimation reliability is validated. The variance between the estimated portfolios and the asset allocation based on real data is very small.

3.4. Methodology

Earlier test of autocorrelation in financial time series revealed that most of the assets' data has autocorrelation even at the first-difference of log-returns. Therefore, GARCH model is the most suitable to be used, since I am interested in examining the diversification benefits of Shari'ah compliant equity ETFs in emerging markets. I consider the time variability of assets' correlations and find optimal portfolios accordingly. To do so, I use Dynamic Conditional Correlation (DCC) model, and Asymmetric Dynamic Conditional Correlation (A-DCC) model. These models are chosen, because they have been largely used in empirical estimating conditional correlations (Colacito et al. 2011) and introduced the asymmetry element in large panel data (Cappiello et al. 2006; Jondeau and Rockinger, 2012; Kalotychou et al. 2014; among others). They have been proven that they work and provide statistically significant results for the given research questions.

Before any further explanation, it is important to briefly demonstrate the reasons behind developing these models and show that they are empirically valid. Before the DCC-GARCH model, there has been a complexity in using multivariate-GARCH models such as BEKK[12] by Engle and Kroner (1995). BEKK-GARCH model stems from the first class of multivariate Vector Error Correlation (VEC-GARCH) model, which was developed by Bollerslev et al. (1988) as an extension of the univariate GARCH. There are several advantages for the BEKK model. First, it provides semi-positive definiteness for the correlation matrix and

[12] The acronym comes from the names of authors proposing this model: Baba, Engle, Kraft and Kroner.

allows different assets' returns and volatilities to interact. Second, it is parsimonious when it comes to the number of parameters required.

Nonetheless, it has a serious disadvantage. If many assets (more than 2) are to be examined, the BEKK model will contain too many parameters that cannot be interpreted, or do not directly represent the lagged residuals or lagged volatility estimates of the assets. Such difficulty in estimating the BEKK model made it unusable in my research due to the large number of assets I are using (17 assets). The number of parameters in the BEKK (1, 1, and 17) model is K (5K+1)/2 (i.e. I would have 731 parameters in the 17-asset case).

Afterwards, the constant conditional correlation (CCC) model was proposed by Bollerslev (1990) to calculate the time-varying covariance and overcome the problem of estimating a large number of parameters. In this model, investors are proposed to believe that changes in covariance are driven by the changes in conditional standard deviation, where correlations are assumed to be constant through time. However, there is empirical evidence which refuses the assumption of constant correlations over time (ex: Engle and Sheppard 2002; Jondeau and Rockinger, 2012). Thus, the dynamic conditional correlation (DCC) model is more preferable than the CCC model. Longin and Solnik (1995) examine the constant conditional correlation model, and reject the assumption that international correlations between developed markets are constant over time.

Moreover, Chevallier (2012) investigate the adequacy of BEKK-GARCH and CCC-GARCH models and estimate the time-varying correlations between oil, gas and CO_2, using daily prices from April 2005 to December 2008. They find that residuals generated by the models are auto-correlated which means that the models are not correctly specified and fail to capture adequately the correlations between the three time series. Furthermore, they find many parameters statistically insignificant, which indicate that the model may be over-parameterised. As a result, Engle (2002) and Tse and Tsui (2002) overcome the CCC model's constant correlation disadvantage by developing the DCC model.

3.4.1 Dynamic Conditional Correlation (DCC) model

I use the Engle (2002) model which is estimated in two steps (i) volatility modelling to find the standardised errors, and (ii) correlation modelling to estimate the time-varying correlation matrix and covariance matrix to be used in the portfolio optimisation. The 2 steps are explained below:

Step 1) Estimate mean equation for each asset's return r_t (*k x 1* vector of asset returns), where ε_t (*k x 1)* (vector of asset returns' innovations) with mean equal zero depending on the information available at time *t-1*:

$$r_t = \mu + \varepsilon_t \,, \tag{1}$$

$$\varepsilon_t \mid \Omega_{t-1} \sim N(0, H_t). \tag{2}$$

First, I follow Fleming, Kirby, and Ostdiek (2001, 2003) and assume constant expected returns.

After that, I fit the asymmetric GJR-GARCH model developed by Glosten, Jagannathan, and Runkle (1993), to obtain the conditional variance $\sigma_{i,t}^2$ for each asset and the standardized errors $\varepsilon_{i,t}$:

$$\sigma_{i,t}^2 = \omega_i + \beta_i \sigma_{i,t-1}^2 + \alpha_i \varepsilon_{i,t-1}^2 + \gamma_i \varepsilon_{i,t-1}^2 1A_{\{\varepsilon_{i,t-1}<0\}}, \quad i = 1, \dots\ , n \tag{3}$$

where *1A* is an indicator function which has value 1 if it is true and 0 otherwise.
A negative value of 'ψ' implies that periods with negative residuals would be immediately followed by periods of a higher variance compared to the periods of positive residuals. γ_i indicates the asymmetry in volatility, and $\beta_i < 0$ assures that the variance process is stationary.

I decided to use a univariate GARCH model for the first step. Alexander (2001, chap.7) notes when the coefficients are diagonal matrices, each variance/covariance term follows a univariate GARCH model with the lagged variance/covariance terms and squares and cross products of the data become more simple (Ledoit et al. 2003). Though, complicated restrictions on the coefficient parameters are needed to guarantee their positive-definiteness. These restrictions are often too difficult to satisfy in the course of iterative optimisation of the likelihood function, even when the number of assets is five or more. Consequently, for large covariance matrices the use of full multivariate GARCH models has proved impractical (Engle, 2002).

Step 2) Use the normalized standardised errors ε_{it} from the fitted GARCH model to compute $R_t = \{\rho_{ij,t}\}_{i,j=1,....,n}$ as a $k\ x\ k$ diagonal matrix which is the symmetric positive definite time-varying correlation matrix using Maximum Likelihood Estimator (MLE) (assuming that asset returns are conditionally Gaussian). Afterwards, I estimate H_t the conditional covariance matrix using $D_t = \{\sigma_{i,t}\}_{i=1,.....,n}$ which is a *k x k* diagonal matrix with conditional standard deviations on the diagonal:

$$H_t = D_t R_t D_t \tag{5}$$

Following the specification made by Engle and Sheppard (2001), and Engle (2002) the correlation matrix is computed as:

$$R_t = diag(Q_t)^{-1/2}\, Q_t\, diag(Q_t)^{-1/2} \tag{6}$$

$$Q_t = (1 - \delta_1 - \delta_2)\bar{Q} + \delta_1(u_{t-s}u'_{t-1}) + \delta_2 Q_{t-1} \tag{7}$$

Given that $u_t = D_t^{-1}\varepsilon_{it}$ is the standardized errors scaled by their conditional variance estimated in the first step, $\bar{Q}$ is the unconditional covariance of the standardized errors u_t, and Q_t is a *k * k* symmetric positive definite matrix. I impose the non-negativity and stationarity restrictions $0 \leq \delta_1, \delta_2 \leq 1$, and $\delta_1 + \delta_2 \leq 1$.

Accordingly, The DCC model gives more stylised facts about correlations such as time-variation and asymmetry (Engle, 2000). Engle and Sheppard (2001) state, the significance of correlation asymmetry will be decided by looking at the log-likelihood function estimated based on GJR GARCH parameters from the first step:

$$L = \frac{-1}{2}\sum_{t=1}^{T}(k(2\pi) + 2\ |\mathrm{D_t}| + \log(|\mathrm{R_t}|) + \eta_t' \mathrm{R_t^{-1}} \eta_t'). \tag{8}$$

3.4.2 Asymmetric Dynamic Conditional Correlation (A-DCC) model

I use the extension of the DCC model; The Asymmetric DCC (A-DCC) model developed by Sheppard (2002). It allows for asymmetries in the conditional covariance matrix as follows:

$$Q_t = C + \delta_1^2 u_{t-s} u'_{t-1} + \delta_2^2 Q_{t-1} + \delta_3^2 \eta_{t-1} \eta'_{t-1} \tag{9}$$

where $\eta_t = I[u_t < 0]_{\otimes u_t, \otimes}$ represents the element-by-element Hadamard product (Davis, 1962) , $C = \bar{Q} = -\delta_1^2 \bar{Q} - \delta_2^2 \bar{Q} - \delta_3^2 \bar{N}$ and $\bar{N} = E[\eta_t \eta']$, where the expectation is replaced by its sample analogue. The model allows joint negative shocks to have a stronger impact on correlation than positive shocks of the same size and nests the symmetric DCC. Model estimation is by quasi-maximum likelihood (QML). Inferences are based on Bollerslev-Wooldridge non-normality robust standard errors (Bollerslev and Wooldridge, 1992). Individual significance tests are based on *p-values* less than 1%.

3.4.3 The Integrated GARCH Model (IGARCH)

For the robustness analysis, I will investigate the time variability in assets correlations by estimating the volatility using the Integrated GARCH (IGARCH) model, and estimate the time-varying variance-covariance matrix using DCC model. The advantage of using IGARCH model is that it allows for highly persistent volatility, which is intuitively assumed in emerging markets returns, and found by empirical evidence.

In the case $\alpha_1 + \beta_1 = 1$ where, the GARCH (1, 1) model becomes:

$$\sigma_t^2 = \alpha_0 + (1 - \beta_1)\alpha_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \tag{10}$$

The integrated GARCH model[13] (Engle and Bollerslev, 1986) assumes that the persistence P = 1 (squared shocks are persistent), and imposes this during the estimation procedure. So, the variance follows a random walk with a drift α_0. Since I generally do not observe a drift in variance, I will assume $\alpha_0 = 0$. Because of unit persistence, none of the other results can be calculated (i.e. unconditional variance, half-life etc). When $\alpha_1 + \beta_1 = 1$, and $\alpha_0 = 0$, the l-step ahead forecast that I derived for a GARCH (1, 1) model becomes:

$$\begin{aligned} \hat{\sigma}_{t+1}^2 &= \alpha_0 + (\alpha_1 + \beta_1)\hat{\sigma}_{t+i-1}^2 \\ &= \hat{\sigma}_{t+i-1}^2 \\ &= \sigma_t^2 \end{aligned} \tag{11}$$

[13] The stationarity of the model has been established in the literature, but it does not encounter the possibility of omitted structural breaks. Structural breaks are not investigated in this research.

3.4.4 Out-of Sample Forecasting

I perform out-of sample forecasting to evaluate the performance of the dynamic strategy during different time periods. The DCC and A-DCC are re-estimated over a rolling window of length-100 days to generate one-step-ahead covariance matrix forecasts.

3.4.5 Performance Evaluation for the Dynamic and Static Strategies

I use the Modified Sharpe ratio (1994) to evaluate the performance of the optimal portfolios. Originally, Sharpe ratio represents the excess return per unit of risk, where the unit of risk is the standard deviation of the returns. The Sharpe ratio used is useful when assets are normally distributed.

$$\text{Sharpe Ratio} = \frac{\mu - R_f}{\sigma} \tag{12}$$

However, in this research assets' returns are far from being normal as shown in Tables 2, 3, 4 (p.111-114) and Figure 2 (P.82). This is the reason behind using the Modified Sharpe ratio which represents the excess return divided by the modified Value-at-Risk:

$$\text{Modified Sharpe Ratio}_{\mathrm{p}} = -\frac{\mu - R_f}{R_f - MVaR_p} \tag{13}$$

where the modified Value-at Risk equals to:

$$\mathrm{MVaR}_{\mathrm{p}} = \mu + \left[\mathcal{Z}_p + \frac{1}{6}\left(\mathcal{Z}_p^2 - 1\right)S + \frac{1}{24}\left(\mathcal{Z}_p^3 - 3\mathcal{Z}_p\right)K - \frac{1}{36}\left(2\mathcal{Z}_p^3 - 5\mathcal{Z}_p\right)S^2\right]\sigma \tag{14}$$

3.5 Empirical Results

In this section, I will demonstrate the stylised facts about my sample data.

3.5.1 Data Description

Table 2 (p.111), Table 3 (p. 112), and Table 4 (P. 114) report several distributional statistics for the logarithmic returns of ETFs for three periods. All daily returns in all samples are non-normally distributed. The kurtosis is either less than three or more than three for all ETFs.

Regarding autocorrelation, the Augmented Dickey-Fuller test t-statistic is significant for all ETFs in the three samples, which indicates the data stationarity and strong rejection of the null hypothesis of unit root. Ljung box Q-statistics show that squared daily returns have autocorrelation for all ETFs. This means that there is more predictability in conditional volatility than returns. This can be explained by the time-varying risk premia model or what is called volatility feedback by Campbell and Hentschel (1992). They find that negative shock in returns causes larger increase in variance because expected return should be sufficiently high to compensate investors for the increased volatility. Therefore, this creates more volatility. According to Cappiello (2006), volatility feedback applies for both bonds as well as stocks through the CAPM, which treats bonds as risky assets. Accordingly, I employ generalised autoregressive conditional heteroskedasticity (GARCH) models to detect any asymmetric volatility in the first step of the DCC model estimation.

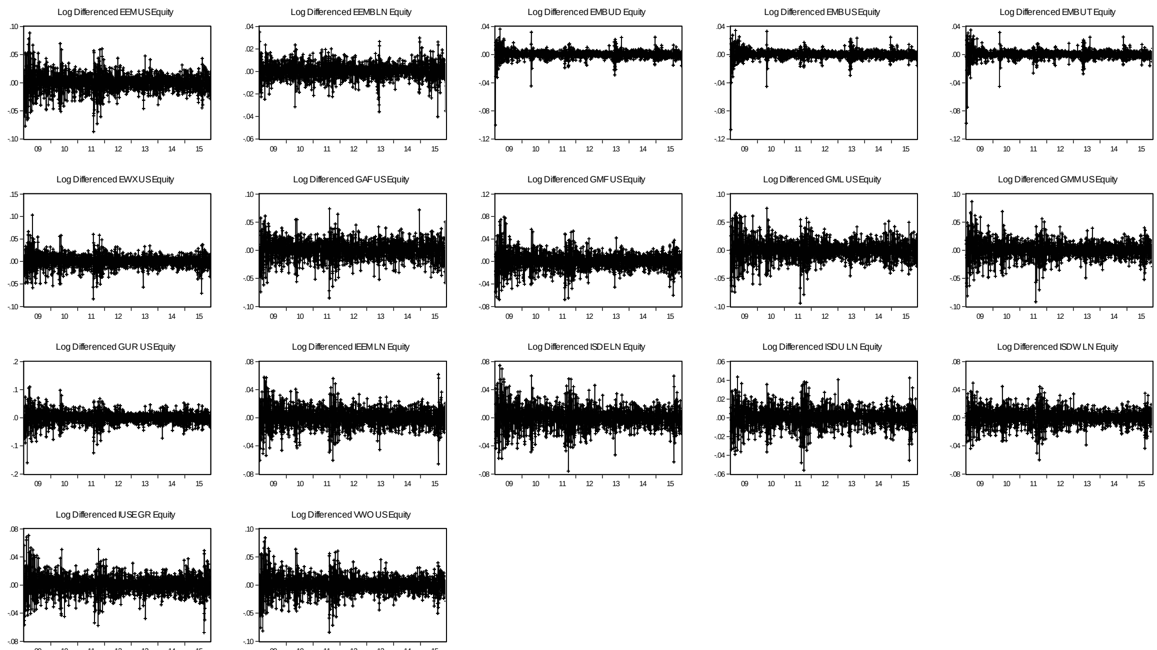


Figure 1 Full Sample Log Returns (05/09/2009 to 23/10/2015)

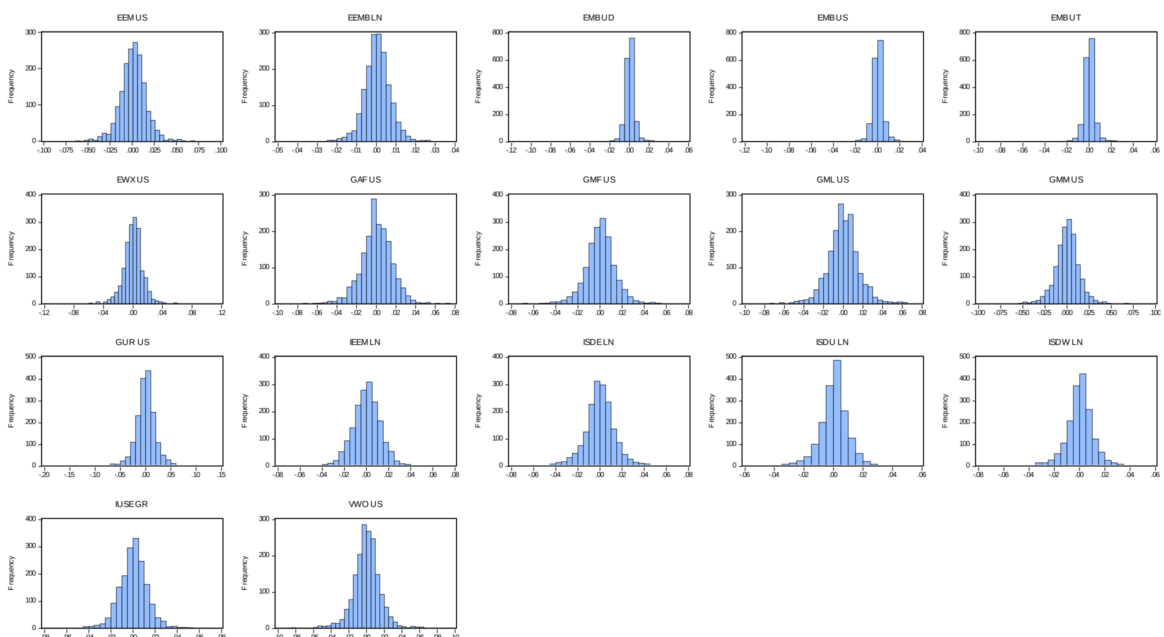


Figure 2 Histograms for Full Sample Log Returns (05/09/2009 to 23/10/2015)

As seen in the plot, most ETF returns in the three samples are significantly negatively skewed, and the Jarque Bera test for non-normality strongly rejects the null hypothesis of normal distribution at 1% level. So, there is a similarity in the distribution patterns between Shari'ah compliant equity ETFS, emerging markets conventional equity and fixed income.

For the full sample Table 2 (p. 111), Shari'ah compliant equity ETF traded in USA has the highest average daily return (0.00043), followed by emerging markets fixed-income in London (0.000346), World Shari'ah compliant equity (0.000328), and Asia and Pacific emerging markets equity (0.000327). Latin America emerging markets have the lowest average return (-0.00006) among all ETFs. Emerging markets fixed-income ETFs (EMBUD, EMBUS, EEMBLN) are characterised by the lowest volatility levels (0.0058, 0.0059, 0.009) respectively. Whereas, European emerging markets equity have the highest volatility level. Shari'ah compliant equity volatility levels are not significantly different than that for emerging markets conventional equity.

Over the in-sample and out-of sample periods, I observe many changes in the average return. In the in-sample Table 3 (p. 112), emerging market conventional equity from all regions has relatively higher average returns. World Shari'ah compliant equity (ISDW) has the lowest return (0.000342) unlike the rest of Shari'ah compliant equity which have similar average returns compared to emerging fixed-income ETFs. ETFs volatility levels are similar to the levels I mentioned for the full sample.

Over the out-of-sample period Table 4 (p.114), most ETFs have negative average returns, including emerging markets Shari'ah compliant equity. Emerging Latin American markets (GMLUS) record the lowest level of (-0.00083). However, USA Shari'ah compliant equity (ISDULN) and world Shari'ah compliant equity (ISDWLN) have the highest average returns (0.0003665, 0.00022) respectively.

The research analysis is based on the interaction between all ETFs, so all unconditional correlations are of relevance. For the full sample Table 2 (p.111) emerging markets small cap ETF (EWXUS) has very low correlation with all other ETFs because of its different holdings. Generally, emerging markets conventional equity from different regions is strongly correlated. This can be intuitively explained by the general downturn in emerging markets due to capital withdrawals and the negative signals of the asset purchases programmes by the Fed and European central bank. In addition, some of the ETF top holdings are common in the major indices they are mimicking such as FTSE EM, MSCI EM and S&P EM. On the other hand, Shari'ah compliant equity ETFs are weakly correlated with the all other conventional ETFs. This is due to equity screening based on Islamic law; therefore their top holdings are different. However, Shari'ah compliant equity from World, the US and emerging markets equity traded in London are moderately correlated due to similar top holdings. Other correlations in the subsamples do not show any specific differences from the full sample.

3.5.2 GJR-GARCH Empirical Results

Below is a summary of the main findings regarding the estimation results of the GJR-GARCH as reported in Table 5 (p. 114).

a) Results for Conventional Emerging Markets Equity ETFs

The variance equation (4) for the full sample shows the asymmetry in volatility parameter γ is significantly positive for general emerging markets ETFs: EEMUS, VWOUS, IEEMLN at (1%), and GMMUS at (5%) conventional levels. Also, these strong results apply to emerging Middle East and Africa (GAFUS), and emerging Europe (GURUS) at 1% level. This indicates that bad news had a stronger effect on volatility than good news and volatility persists for a longer time. Though, there is an absence of volatility persistence in emerging Asia pacific (GMFUS) and emerging Latin America (GMLUS), since the persistence parameter β is insignificant. The rise in the effect of short-term volatility can be explained by the insignificance of the constant term ω in the variance equation for all conventional equity except for GAFUS and IEEMLN.

For the in-sample, results do not differ greatly from the full sample, but two main things changed. Firstly, the asymmetry in volatility parameter for GMMUS is insignificant. Secondly, instead of having a significance level at 1% for EEMUS, VWOUS, GURUS, and IEEMLN asymmetry in volatility, it turned out to be significant at 5% for EEMUS, VWOUS and 10% for IEEMLN. The constant term ω is insignificant for all conventional equity, except GAFUS, GMLUS and IEEMLN at 1%, 5%, and 10% level respectively. This is an interesting result since insignificant omega-term means that the unconditional average volatility is zero and indicates that the ETFs have become more stable on the long-run (or in this case the ETFs started to recover after the global financial crisis)

The out-of-sample also shows similar results to the full sample. However, all previously mentioned ETF parameters are significant at 1% level, with the emerging Asia Pacific (GMFUS) ETF joining the list with significant asymmetry in volatility at 1% level. The constant term ω is significant for GMFUS, EWXUS, GMMUS, GAFUS, and IEEMLN at different conventional levels. Here the unconditional volatility has become higher, since it captured the shock caused by the European debt crisis.

b) Results for Conventional Emerging Markets Fixed-Income Securities ETFs

In the full sample, only JP Morgan emerging markets bond ETF (EMBUS) has significant asymmetry in volatility at 10% level. Whereas none of fixed-income ETFs shows any asymmetry in the in-sample, and only JP Morgan emerging market bond ETFs (EEMBLN) traded in London, and JP Morgan emerging markets bond (EMBUT) (NASDAQ intraday) have significant asymmetry at 5% and 10% level respectively. The constant term ω is insignificant for all ETFs in the full sample and the in-sample period. However, it turns out to be only significant for JP Morgan emerging markets bond intraday ETF at 10% level.

c) Results for Shari'ah Compliant Equity ETFs

Generally, Shari'ah compliant equity show significant asymmetry in volatility across the three research samples at all conventional levels. More specifically, there is no presence of asymmetry in volatility for only world Shari'ah compliant equity (ISDWLN), since the parameter is insignificant. For the in-sample period all Islamic ETFs show significant asymmetry but at different levels. ISDWLN and IUSEGR parameters are significant at 10%, ISDULN asymmetry parameter is significant at 5% and ISDELN parameter is significant at 1%. Lastly, all Islamic ETFs' asymmetry parameter in the out-of-sample is significant at 1% level. The constant term ω is significant at 1% level for only the United States Shari'ah compliant equity in the full sample, World Shari'ah compliant equity at 10% level for only the in-sample, World Shari'ah compliant equity and Shari'ah compliant equity in emerging markets at 1% and 5% level respectively.

Overall, for the GJR-GARCH model estimation, the in-sample shows weak or insignificant asymmetry in volatility for most of the ETFs analysed in this research, while the out-of-sample period shows strongly positive asymmetry in volatility for most conventional equity and all Shari'ah compliant equity on the highest probability level (1%). The in-sample estimation tackles a recovery period after the global financial crisis which explains the weakening of the asymmetry in ETFs' volatilities. On the other hand, courtesy to the European debt crisis in 2011, all ETFs' long-term volatility increased and most of them had negative average returns. This explains the stronger asymmetries in volatility and the stronger response to negative shocks in returns relative to the positive ones. This is in-line with prior literature which shows the negative impact of the European debt crisis on emerging markets.

3.5.3 Goodness of Fit Tests

DCC model fit turned to be a good fit after performing several tests. First, I tested for possible heteroskedasticity using the root-mean-square error (RMSE), the mean absolute error (MAE). These tests are measures of how different are the values predicted by a model and the values observed. As shown below, the results are almost zero.

Test	DCC
MAE	0.05
RMSE	0.07

Second, I performed Pearson's product-moment correlation to test for the significance of correlation between the Fitted DCC (in-sample) and the forecasted DCC (out-of-sample). The p-value of the correlation is significant at 1% level. Figures 3 and 4 below show how the movement of the fitted and forecasted DCC are similar for two different couple of ETFS.

Pearson's product-moment Correlation			
Data: Fit and Forecast			
T	2038.5	df	259520
p-value <	2.20E-16		
correlation	0.97016		

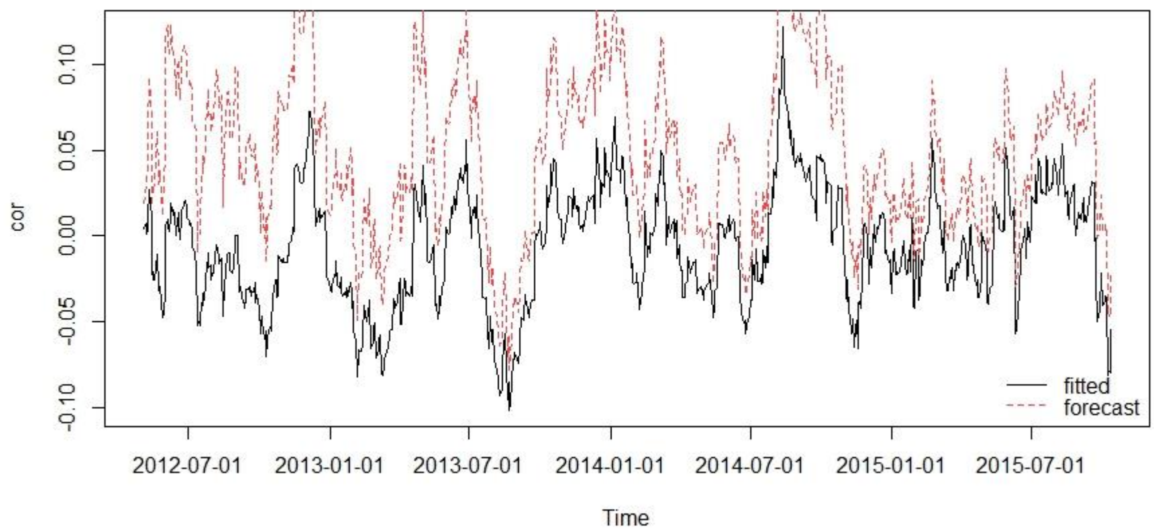


Figure 3 DCC fit and DCC Forecast for EEMUS – VWOUS

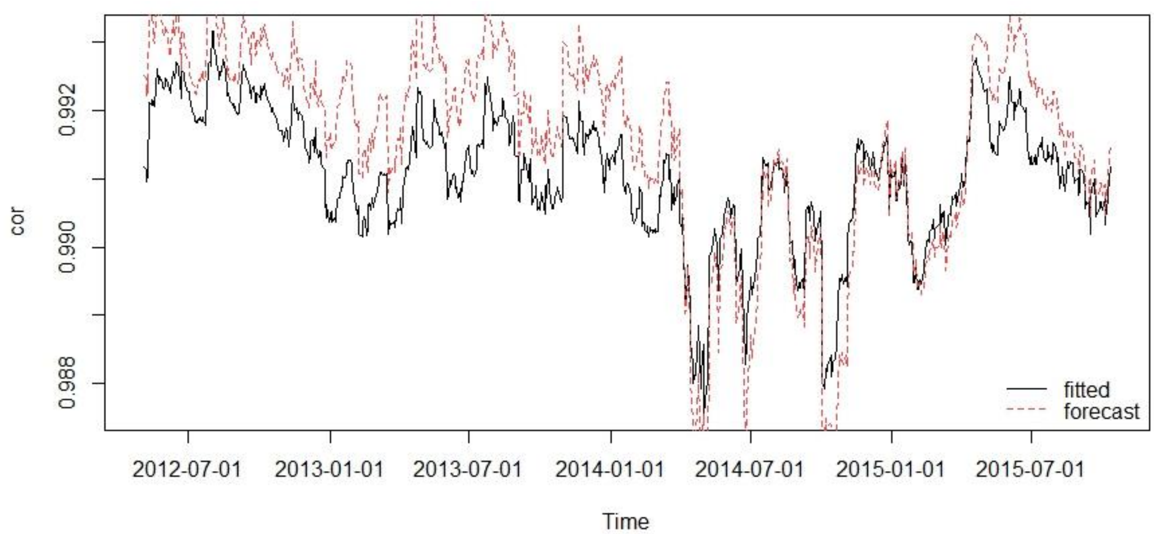


Figure 4 DCC fit and DCC Forecast for – EEMBLN- ISDWLN

Figure 3 (p. 91) shows the time-varying correlations between two general EMETFs traded in the US (EEMUS and VWOUS), while Figure 4 (p. 91) shows the time varying correlation between EM conventional equity and Shari'ah compliant equity traded in the UK. I selected the ETFs to be traded in the same market to control for any time difference. As I can see, the movement of the conditional correlation of the fitted and forecasted DCC are similar. This means that the predictability of the model is good.

Moreover, Table 8 (p. 120) shows the empirical log-likelihood function and Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). These information criteria are designed explicitly for the model selection. Model selection criteria generally involve information criteria function calculations for each of the models. I pick the model for which the function is minimized. There is a slight increase in the log-likelihood when the asymmetric parameter is added in the A-DCC model. On the other side, AIC and SIC information criteria are smallest for the DCC model, and this indicates that the DCC is more parsimonious than the A-DCC.

3.5.4 In-Sample Estimation Results

In equation (7), the first parameter δ_1 measures the short-run persistence. If its value increases, this means that recent news have a bigger impact on conditional correlation. As Table 7 (p. 119) shows, the parameter is strongly significant at 1% level.

The second parameter δ_2 represents the dynamic structure of conditional correlations. If increased and significant, this means that conditional correlations become more persistent which implies that joint ETFs shocks have longer lasting effects on the conditional correlations. The parameter turns out to be strongly significant also at 1% level. Thus, the conditional correlations can be concluded to be changing over time, and their variability is persistent. Intuitively, this will have an effect on the optimal portfolios under the dynamic strategy compared to static mean-variance strategy.

The asymmetric version of DCC (A-DCC) model adds an additional parameter $\delta_{3,}$ to measure the asymmetry of correlations as shown in equation (9). The results in Table 7 (p. 119) show that the parameter is significant at 1% level. This indicates that ETFs joint negative shocks have a stronger impact on correlation than positive shocks of the same magnitude. There is little explanation for the asymmetric response to joint bad returns (bad news) in correlations. A possible explanation by Cappiello et al. (2006) is not formalised yet in a multivariate model. This explanation is backed by the time-varying risk premia. In particular, when there is a negative shock and the variance of two assets increase in a CAPM world, investors will typically expect higher returns to compensate the larger variance. As a result, both assets' prices will decrease and asset correlation will go up. This is usually the case in down markets as observed in emerging markets over the past 7 years. Thus, correlation may be higher after a negative than a positive innovation of the same magnitude, indicating its sensitivity to the sign of past shocks. They also have another likely explanation which is that dependence in returns is higher for large negative returns, and possibly nonlinear. In this case, the increased correlation observed is simply a linear approximation to the nonlinear dependence.

The rise in correlations during down markets may also be due to cross market herding, courtesy of the enhanced globalisation process which allows for free movement of capital internationally. When markets internationally do badly, international investors tend to modify their positions in tandem. Again, the fact that the period under consideration is a crisis one further supports this argument, as investors tend to often resort to herding when crises break out.

3.5.5 Time-Varying Optimal Weights Based on the Dynamic Strategy (DCC/A-DCC)

This research tries to answer whether or not Shari'ah compliant equity decreases the risk for a portfolio of conventional emerging markets investments. To investigate this issue, I use the two dynamic strategies following DCC and A-DCC models. Considering the estimated variance-covariance matrix from the DCC and A-DCC model, Table 9 (p. 121) shows the time varying optimal allocation for the ETFs being investigated. Portfolio optimisation is conducted using daily data with the objective of minimising portfolio risk (standard deviation), by solving a non-linear programming problem. The DCC and A-DCC models result in similar results, and the optimisation output reveals the following main empirical results:

a) Optimal Weights: Full Sample

Both the DCC and A-DCC models favour the USA Shari'ah compliant equity (ISDULN) with allocated weights equal to 86.62% and 87.36% respectively. The rest of portfolio weights are distributed over the fixed income ETF (EEMBLN), and the conventional emerging Asia Pacific ETF. When I take out the Shari'ah compliant equity ETFs from the portfolio optimisation, the dynamic strategy favours emerging markets fixed-income (EEMBLN) and (EMBUT) with approximate weights equal to 48.77% and 32.24%.

b) Optimal Weights: In-Sample

Since ETFs return/risk characteristics and time-varying correlations become different in the in-sample, the optimal asset allocation changes as well. Nearly 50% of the portfolio full investment goes to conventional emerging fixed income (EEMBLN) and 37.39% to the conventional emerging small cap stocks (EWXUS). The emerging Shari'ah compliant equity ETF (IUSEGR) comes in the third place with 17.39% of the total portfolio. When Shari'ah compliant equity is excluded, time-varying optimal weights are similar to the previous portfolio, but the 17.39% for IUSEGR is now divided between conventional general emerging equity ETF (IEEMLN) and conventional emerging Latin America (GMLUS).

c) Optimal Weights: Out-of- Sample

I do not impose any weight restrictions on the asset allocation. Surprisingly, the dynamic strategy put the full investment in the USA Shari'ah compliant equity (ISDULN). When the optimisation is repeated without Shari'ah compliant equity, the full investment is divided between conventional emerging fixed-income securities only. The highest weight goes to emerging markets fixed income ETF (EMBUD) with approximately 70% of total portfolio weight.

3.5.6 Optimal Weights Based on the Static Strategy

It is interesting to see how the naive mean-variance strategy will allocate the assets in the optimal portfolios compared to the dynamic strategy mentioned earlier. Based on the results in Table 10 (p. 122), I report below the main results under the three samples:

a) Optimal Weights: Full Sample

Generally, the mean-variance strategy favours the least risky assets which are the conventional emerging markets fixed-income ETFs. EMBUD, EMBUT, EMBUS received the highest weights in the portfolio in the full sample. On the other hand, Shari'ah compliant equity ISDULN and IUSEGR weights are equal to 7.57% and 4.23% respectively.

b) Optimal Weights: In-Sample

Similar results to the full sample are reported in the in-sample. However, the weights given to Shari'ah compliant equity become less, and the more weight goes to the most favourite asset class in the mean-variance strategy; the conventional emerging fixed-income ETFs.

c) Optimal Weights: Out-of sample

The results are similar to the full and in-sample, but the weights for Shari'ah compliant equity increased slightly. In particular, the weight for ISDULN and IUSEGR increased from the in-sample by 1.24% and 1.84% respectively.

Overall, the optimisation process under dynamic and static strategies excluded many ETFs for the three asset classes under investigation. The major ETFs which are significantly present in the portfolio are all conventional Fixed-Income ETFs, and only The USA Shari'ah compliant equity ETF (ISDULN) and the emerging market Shari'ah compliant equity ETF (IUSEGR). For conventional emerging market equity, only emerging equity (IEEMLN), emerging Latin America market (GMLUS), and emerging small-cap stocks (EWXLN) receive small weight in the optimal portfolio.

3.5.7 Portfolio Performance Evaluation under Dynamic Strategy and Static Strategy

After reporting the findings about the optimal weights under the dynamic and static strategies, it is important to assess the portfolios' performance with and without the Shari'ah compliant equity ETFs in the three samples.

a) Portfolio's Risk Level

Regarding portfolios' risk level (measured by standard deviation), the portfolio optimisation is performed with the objective of minimising portfolio risk. The results in Table 9 (p. 121) show that portfolios' risk is more than double for the dynamic strategies compared to the static strategy Table 10 in all research samples. Under the dynamic strategies, the inclusion of Shari'ah compliant equity ETFs in the portfolios leads to higher risk in the full sample (from 0.59% to 0.72%), and doubles the standard deviation in the out-of sample (from 0.32% to 0.70%). The accounting for the asymmetries in conditional correlations does not result in noticeable difference in portfolios' risk level.

b) Performance Gains: Modified Sharpe Ratio (mSR)

Continuing the results, Table 11 (p. 123) shows the modified Sharpe ratios for the optimal portfolios under the dynamic and static strategies for three samples. In all, adding Shari'ah compliant equity ETFs to the portfolios results in higher modified Sharpe ratio under the in-sample and out-of sample only under the dynamic strategies (DCC and A-DCC). For the static strategy, Shari'ah compliant equity ETFs' inclusion led to better return per risk in all samples. Comparing the dynamic and static strategies, estimated modified Sharpe ratios are higher for the optimal portfolios under the static strategy in the full sample and in-sample. However, in the out-of sample the dynamic strategies result in better portfolios. More particularly, the static strategy over-performs the dynamic strategy in the full sample by 0.02 for conventional and Shari'ah compliant equity ETFs portfolio, and 0.01 for conventional portfolio. Also, it leads to a rise of 0.01 for both portfolios under the in-sample. On the other side, the dynamic strategy outperforms the static strategy by 0.03 for the mixed portfolio of conventional and Shari'ah compliant equity ETFs and 0.01 for the conventional portfolio. The results also suggest that there is no difference in portfolios performance between the symmetric and asymmetric DCC models.

3.6 Robustness Analysis

As I discussed in the previous section, I divided the full sample into two subsamples to avoid over-fitting for the parameter estimation and asset allocation.

For further confirmation of the Shari'ah compliant equity ETFs diversification benefits, I decided to choose another conditional volatility model, to estimate the volatility matrix and standardised residuals. I repeated the analysis using IGARCH instead of GJR-GARCH model, to estimate the volatility matrix and standardised residuals to be used in the DCC model estimation. I re-estimated the model for the three research samples (full sample, in-sample and out-of sample). I chose the IGARCH model, because it captures the high volatility persistence, which is empirically found in emerging markets returns' behaviour. I used it in the first step of the symmetric version of DCC model only, because the A-DCC was less parsimonious than the DCC.

Based on the variance equation (11), the results in Table 6 (p. 117) suggest that the volatility persistence for all assets in all samples are significantly strong except for EMBUD. The volatility persistence of the ETFs ranges between (0.93, 0.99) in the full sample, (0.94, 0.98) in the in-sample, and (0.90, 0.99) in the out-of sample. The DCC-IGARCH results in Table 7 (p. 119) are in line with DCC-GJR GARCH and A-DCC-GJR-GARCH. δ_1 indicates that there is persistent effect of shocks on conditional correlations and it is strongly significant in the three samples at 1% level. While δ_2 parameter estimates are very similar to those estimated by DCC-GJR-GARCH and A-DCC-GJR-GARCH and indicates that recent news have bigger impact on the conditional correlations (Short-term persistence). However, as you see in Table 8 (p. 120), the log-likelihood function, the AIC and SIC information criteria for the DCC-IGARCH model indicates that it has less predictability of time-varying correlations.

Talking about portfolio optimization results in Table 9 (p.121), the ETF weights estimated from the time varying variance –covariance matrix from the DCC-IGARCH are very similar to those under the DCC-GJR GARCH model. Though, it seems to result in better portfolios in terms of risk-adjusted returns for the portfolios with Shari'ah complaint equity ETFs in the full sample and in-sample. The remaining portfolios show similar modified Sharpe ratios to those under the DCC-GJR-GARCH.

3.7 Portfolio Rebalancing

I calculate rebalanced portfolios, in particular during market volatility to understand better the advantages and disadvantages of the dynamic strategy and static strategy. I construct a portfolio to be monthly rebalanced, where no short sales are allowed and all capital to be invested at all times. As my objective, I seek to minimise the variance of the portfolio. In Figure 5 and Figure 6 (p. 102), I can see that during the period from 2009 until mid-2010, the monthly rebalanced portfolios with Shari'ah compliant equity ETFs under both strategies have similar cumulative return and drawdown risk because the market was rebounding after the financial crisis. In the first period, the dynamic strategy (using DCC models) outperforms the static strategy (mean-variance model).

However, in the second period the static strategy outperforms the dynamic strategy. This suggests that there is a value in considering the time variability in correlations and use the dynamic strategy in high volatility periods. Looking closely to both charts, I find that the volatility of the rebalanced portfolios in the first sample is greater than that in the second sample.

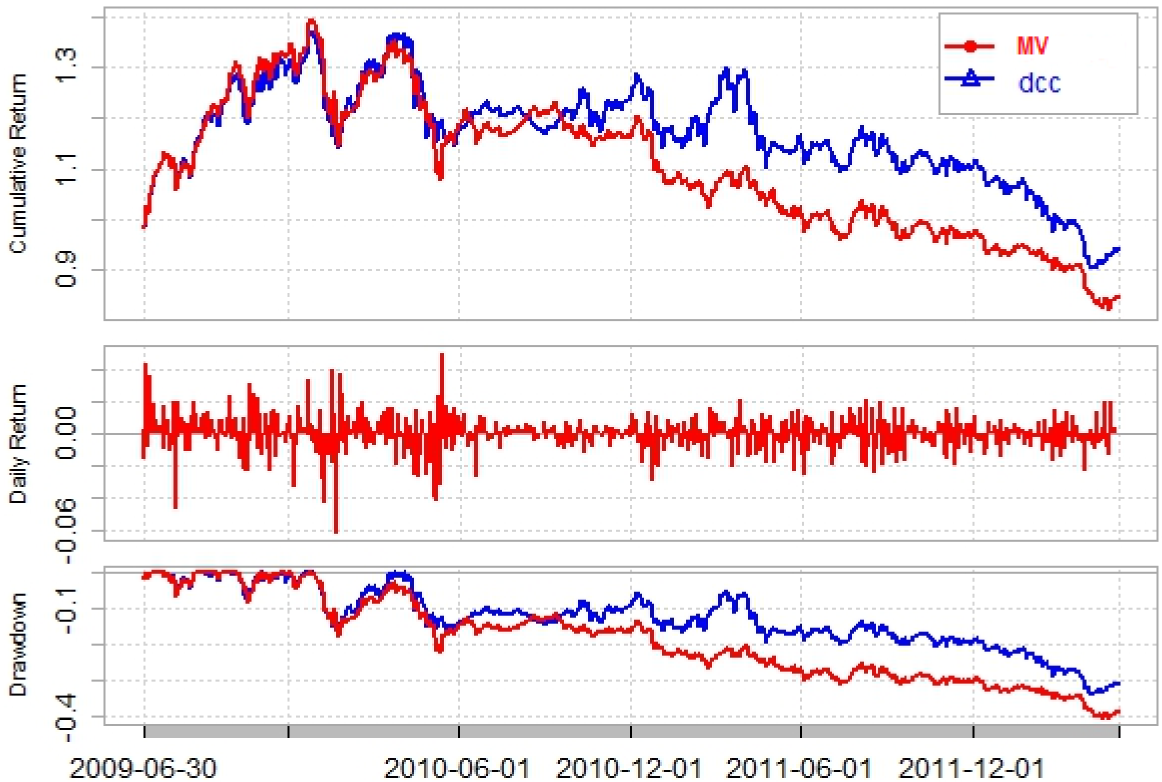


Figure 5 Sample 1 Portfolio performance using DCC and Mean-Variance covariance matrices

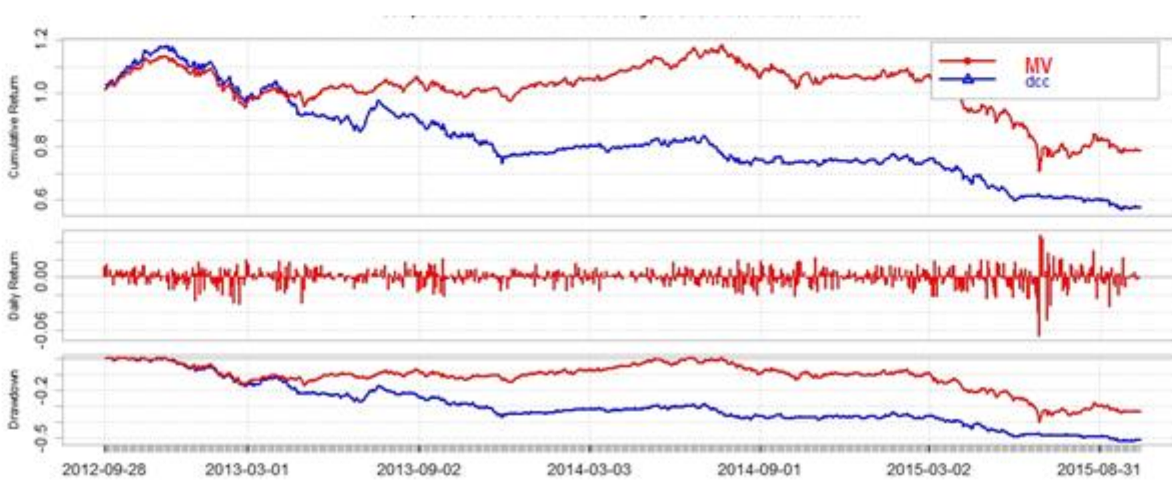


Figure 6 Sample 2 Portfolio performance using DCC and Mean-Variance covariance matrices

3.8 Discussion

In this section, I will discuss my empirical results and their contribution to the research upon two main points. These are the diversification benefits of Shari'ah compliant equity ETFs, and the performance gains of dynamic mean-variance strategy in the context of emerging markets. One of the most important findings of my research is that the inclusion of Shari'ah compliant equity ETFs in an emerging markets portfolio can lead to higher portfolio gains. After applying Engle and Colacito (2006) methodology, and using the DCC model which is introduced by Engle (2002), I tried to investigate whether or not Shari'ah compliant equity ETFs are a good investment choice for an investor in emerging markets. The results I found cannot be generalised all the time with all strategies.

The inclusion of Shari'ah complaint equity ETFs results in higher modified Sharpe ratios under the dynamic and static strategies. They receive proportionally significant weight and are favoured over the conventional equity in the asset allocation across samples. However, the different results from both strategies are attributed to the accounting of the significant role of correlation time-variability in deciding the optimal portfolio weights.

Going in further depth into the time-varying optimal weights of Shari'ah complaint equity ETFs versus conventional fixed-income securities, I believe it is interesting also to examine whether Shari'ah compliant equity ETFs can beat emerging markets fixed income securities. Islamic finance scholars claim that the zero-interest investment makes it more resilient during financial crises. My results indicate that Shari'ah compliant equity ETFs can be favoured over the latter in the optimal portfolios. If the investor added Shari'ah compliant equity ETFs to the emerging market portfolio in the recent years (05/2012-10/2015), he/she can put more weight on them than fixed-income securities. Though, this is not the case in the first sample (01/2009- 05/2012).

Shari'ah compliant equity ETFs help in improving the risk-adjusted return of the portfolio, but this does not necessarily mean they get the highest proportion in the portfolio. Conventional EM small cap (EWXUS) and conventional EM fixed-income (EEMBLN) received higher weights in the first sample, which indicates that Shari'ah compliant equity ETFs are not necessarily more resilient in the aftermath of the European financial crisis. In fact, Shari'ah compliant equity had similar risk levels to conventional equity straight after the financial crisis. This can be justified by the fact that the Shari'ah compliant ETFs I selected are traded in European markets (UK and Germany), which suffered from the European sovereign debt crisis. My justification is in line with the argument of Ajmi et al. (2014) that the Shari'ah compliant equity markets are not isolated from external shocks.

What is more, my results regarding the time-varying weights of Shari'ah compliant equity ETFs and their effect on portfolios' modified Sharpe ratio, remain robust (across samples), using different models (DCC-GJRGARCH, DCC-IGARCH and A-DCC-GRGARCH). Previous arguments regarding the diversification benefits of Islamic assets are mixed; for example, on the global level, Arouri et al. (2013) find that Islamic assets weights increased after the global financial crisis, which result in better overall portfolio performance. On the emerging markets level, Saiti et al. (2014) study whether or not financial integration and time-varying correlations will affect a US investor preference to invest in Shari'ah compliant equity to minimise the risk of an emerging markets portfolio. They find that Islamic emerging markets do not offer diversification benefits to the US investor compared to their conventional counterparts.

My research as a result confirms part of the previous empirical literature, because of the mixed findings found across samples and using different portfolio optimisation strategies. As discussed in the theoretical part of this research, the methodology applied in my research is relatively similar to that applied in Saiti et al. (2014). The different findings can be attributed to several reasons. First of all, I use ETF returns instead of indices' returns. ETF returns can incorporate more information about their variability because they are actually traded unlike indices which represent only general market trends. Furthermore, I believe that my results are stronger, because they extend my investigation by including different markets and different asset classes.

The ETFs selected cover a broad range of emerging markets such as emerging Latin America (GMLUS), emerging Middle East and Africa (GAFUS), emerging Asia Pacific (GMFUS), emerging Europe (GURUS), and general emerging market ETFs (EEMUS, IEEMLN, and others). They represent also conventional equity, conventional fixed-income and Shari'ah compliant equity. With such range, I believe that my findings are strong, because such sample allows me to form a diversifiable emerging markets portfolio, and form a clear idea about the role of Shari'ah compliant equity ETFs in minimising portfolios' risk.

Finally, my approach in fitting the DCC-GARCH model is different, since I specified the DCC model with multivariate normal (MVNORM) distribution instead of skewed student-t (SSTD) distribution. [14] My findings are in line with previous research regarding the predictability of dynamic conditional correlation models by Kalotychou et al. (2014). More specifically, their research is about testing dynamic sector allocation in developed markets (US, UK, Japan, and Germany) from 1996 to 2012. They find that the DCC model is better in terms of the predictability of portfolio gains, and forecasting the time-varying variance co-variance matrix in in-sample and out-of-sample estimation.

My results are relatively different because of the different characteristics of markets I am examining. Moreover, it should be mentioned that, the portfolios resulted from the DCC-GJRGARCH and A-DCC-GJRGARCH are very similar. Although, the asymmetry parameter in the A-DCC model is significant in all samples, it did not help us get more information about whether or not its inclusion may affect the optimal portfolios.

Overall, dynamic portfolio optimisation strategies are not intended to work perfectly everywhere and all the time. Sometimes it is more efficient to use simple strategies, and it is costly to account for the time-varying correlations; while under different economic condi-

[14] I tried investigating my research question using skewed student-t distribution, but the problem in using it is that Islamic assets' were completely absent in all samples' optimal portfolios. Therefore, this definitely does not help me in answering the main research question.

tions it is more profitable to use the dynamic strategies. In this research, the subsamples have different trends due to different economic conditions, which allowed us to reach material conclusions. In my first sample, I have the European debt crisis which affected ETFs returns. Whereas, in the second sample I have the recent economic turbulence happening in the emerging markets due to many reasons. These include: the dramatic fall in international trade, excessive dependence on foreign financing, currency devaluation, freezing credit markets and Fed's printing of dollars in the US. According to Park and Mercado (2014), regional shocks and shocks from developed markets have the same impact on domestic financial stress in emerging markets. With this in mind, Investors should deal with Shari'ah compliant equity ETFs with caution, not as they are often promoted as "the resilient investment".

After demonstrating a detailed discussion about my research findings, in the next section I will provide the concluding remarks of this chapter.

3.9 Conclusion and Implications

Islamic finance has been promoted more often as a less risky and more resilient investment alternative during financial downturns, because of the profit-loss sharing, the absence of interest rate in business financing, avoidance of speculation, and other reasons. Since the relevant literature shows mixed results regarding the performance of Islamic assets in developed and emerging markets, I identified a gap in the relevant literature. This gap was about whether or not adding Shari'ah compliant equity ETFs to a portfolio of emerging market investments would improve its risk-adjusted return. In recent years, I can see how emerging markets have absorbed many regional and international shocks. This made their investments suffer extensive losses, and become very volatile. To do so, I used ETFs data from a broad range of conventional emerging equity and fixed income securities alongside Shari'ah compliant equity representing from World, USA and emerging markets. More specifically, I used daily returns for a period of seven years, namely from 01/2009 to 10/2015.

I performed dynamic portfolio optimisation using two models: the DCC and A-DCC, and static portfolio optimisation using the Mean-Variance model. The optimisation was repeated three times for three sample periods, to back-test my findings. My results indicate that Shari'ah compliant equity can help in improving the risk-adjusted return of an emerging market portfolio. They lead to improving portfolio performance. Talking about asset allocation, under the dynamic portfolio strategies, Shari'ah compliant equity may be preferred by investors over conventional emerging equity and fixed income-securities in more recent years from 2012 to 2015. Particularly, Many ETFs in my sample experienced negative average returns during this period. However, this was not the case in the post global financial crisis and the European debt crisis period, from 01/2009 to 04/2012, where fixed-income ETFs got the highest weight in the portfolio. On the other hand, the mean-variance strategy favours fixed-income ETFs mostly in all sample periods. After performing monthly portfolio re-balancing, I find that dynamic strategy over-performs the static mean variance during the in-sample period, while static mean-variance optimisation results in more performance gain in the out-of-sample period.

Concluding, what one can infer from findings of this research is that Shari'ah compliant equity ETFs can improve the performance gains for an institutional investor in emerging markets. The benefits of Shari'ah compliant equity ETFs in the portfolio appear more in turbulent market conditions. Also, considering different portfolio optimisation strategies, one should be cautious when considering dynamic strategies. Although the dynamic strategies used in this research gave me more stylized facts about the assets' behaviour, they provided better performance only during the in-sample period. Dynamic strategies can also be more costly to apply in emerging markets, since they result in portfolios with higher risk levels. Future research can investigate further the economic value of these strategies in emerging markets by considering measures such as transaction costs due to rebalancing, and performance fees of switching from one strategy to another. The results are expected not to change if I encountered transaction cost, because the monthly portfolio rebalancing has provided extra piece of information about which strategy is favourable and when a dynamic strategy is favourable during recovery periods after strong hit. It has provided better risk-adjusted returns for my portfolios. However, when there is a crisis effect such as that during the second sample period, a static strategy outperformed. Logically, a dynamic strategy would be more costly during such period due to the extreme shocks in returns and the increased uncertainty.

Table 3 Distributional properties of daily ETFs returns (Full Sample 02/01/2009 : 23/10/2015)

	EEMUS	VWOUS	GMFUS	EWXUS	GURUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	IUSEGR
Mean	0.00014	0.00019	0.000327	0.00028	-3.19E-0	0.0002	9.27E-0	-6.21E-0	0.00025	0.000249	0.000249	0.000346	0.0002369	0.000328	0.000437	0.000118	0.000232
Std.Dev.	0.01628	0.01596	0.014971	0.01435	0.02115	0.01502	0.01659	0.01706	0.00583	0.006198	0.005969	0.009486	0.014597	0.010982	0.010077	0.014836	0.013559
Skewness	-0.06	-0.08	0.08	-0.03	-0.42**	-0.20***	-0.25***	-0.10***	-3.16**	-3.27***	-3.50***	-0.20***	-0.07	-0.19***	-0.27***	0.03	0.04
Ex.kurtosis	3.37*	3.44***	3.54***	4.58***	5.02***	4.04***	1.84***	2.61***	55.4**	52.2***	63.82**	1.64***	1.84***	2.40***	2.73**	2.55**	2.79**
Jarque bera	838.12***	875.82***	928.357***	1546.89***	1908.93***	1216.33***	269.38***	507.76***	22915***	204354***	303562***	212.126***	251.149***	438.318***	573.359***	481.112***	574.082***
ADF test	-20.11***	-20.04***	-20.11***	-43.99***	-19.58***	-44.2***	-45.15***	-24.72***	-9.45***	-21.1***	-9.34***	-25.34***	-42.1***	-41.89***	-41.87***	-42.02***	-42.15**

Jarque Bera is a test statistic for the null hypothesis of normality. ADF is the Augmented Dickey-Fuller test for the null hypothesis of a unit root with 1% and 5% critical values.

The truncation lag = 24 and a downward selection procedure based on the AIC is performed until there is no presence of autocorrelation.

(*) indicate significance at 10% level.

(**) indicate significance at 5%level.

(***) indicate significance at 1% level.

Correlation coefficients, using the observations
5% critical value (two-tailed) = 0.0466 for n = 1767

	EEMUS	VWOUS	GMFUS	EWXUS	GURUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	IUSEGR
EEMUS	1.00	0.99	0.94	0.05	0.88	0.96	0.61	0.87	0.32	0.03	0.32	0.06	0.05	0.04	0.04	0.06	0.01
VWOUS		1.00	0.94	0.05	0.88	0.96	0.60	0.87	0.33	0.04	0.32	0.06	0.05	0.05	0.05	0.06	0.01
GMFUS			1.00	0.04	0.79	0.92	0.56	0.78	0.32	0.03	0.31	0.07	0.05	0.04	0.04	0.05	0.00
EWXUS				1.00	0.05	0.03	0.03	0.06	-0.03	0.04	-0.03	-0.05	-0.04	-0.01	0.00	-0.02	0.02
GURUS					1.00	0.86	0.58	0.79	0.31	0.01	0.31	0.03	0.05	0.04	0.04	0.06	0.04
GMMUS						1.00	0.59	0.85	0.35	0.03	0.34	0.07	0.07	0.06	0.06	0.07	0.02
GAFUS							1.00	0.57	0.19	0.01	0.19	0.02	0.04	0.03	0.03	0.04	0.02
GMLUS								1.00	0.30	-0.01	0.29	0.10	0.06	0.06	0.05	0.06	0.04
EMBUD									1.00	0.23	0.96	0.07	0.06	0.06	0.04	0.07	-0.04
EMBUT										1.00	0.24	-0.06	-0.01	0.04	0.03	0.03	0.08
EMBUS											1.00	0.06	0.06	0.06	0.05	0.07	-0.04
EEMBLN												1.00	0.14	0.00	0.00	0.00	0.00
IEEMLN													1.00	0.74	0.72	0.84	0.14
ISDWLN														1.00	0.96	0.89	0.12
ISDULN															1.00	0.83	0.13
ISDELN																1.00	0.16
IUSEGR																	1.00

Table 4 Distributional properties of daily ETF returns (in-sample) 02/01/2009 : 02/05/2012

	EEMUS	VWOUS	GMFUS	EWXUS	GURUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	IUSEGR
Mean	0.000489	0.00056	0.00054	0.000702	0.000425	0.000538	0.000576	0.000595	0.000406	0.00046	0.000406	0.00059	0.00060	0.000342	0.000435	0.00052	0.00059
Std.Dev.	0.019894	0.01935	0.01818	0.017442	0.026006	0.018202	0.018354	0.020136	0.006993	0.007554	0.007195	0.010151	0.016872	0.013251	0.011806	0.017891	0.015337
Skewness	-0.099**	-0.10***	0.14***	0.05***	-0.48***	-0.21***	-0.35***	-0.22***	-3.76***	-3.75***	-4.11***	-0.05	-0.14***	-0.18***	-0.32***	-0.02	0.11***
Ex.kurtosis	2.30***	2.50***	2.42***	3.11*	3.67***	3.01	1.8068	2.16***	53.22***	47.30***	60.40***	0.41***	1.23***	1.31***	1.77***	1.44***	2.41***
Jarque bera	194.01***	227.72***	215.26***	351.61***	523.03***	335.43***	135.96***	176.05***	104515***	82976.5***	134413***	6.78**	58.36***	67.85***	128.75***	75.22***	213.03***
ADF test	-19.46***	-19.38***	-19.44***	-43.24***	-18.89***	-43.31***	-25.36***	-41.26***	-9.00***	-20.53***	-8.89***	-40.77***	-40.58***	-40.20***	-40.26***	-40.44***	-41.42***

Correlation coefficients, using the observations

5% critical value (two-tailed) = 0.0665 for n = 869

	EEMUS	VWOUS	GMFUS	EWXUS	GUFUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	IUSEGR
EEMUS	1	0.98	0.94	0.08	0.91	0.95	0.86	0.92	0.26	0.02	0.25	0.03	0.06	0.04	0.04	0.06	0.03
VWOUS		1	0.93	0.08	0.91	0.95	0.85	0.91	0.26	0.03	0.25	0.02	0.07	0.05	0.06	0.07	0.028
GMFUS			1	0.06	0.84	0.91	0.79	0.85	0.28	0.01	0.27	0.04	0.06	0.03	0.03	0.063	0.02
EWXUS				1	0.07	0.06	0.03	0.08	-0.026	0.03	-0.03	-0.10	-0.04	0	0	-0.01	0.04
GURUS					1	0.89	0.81	0.85	0.24	0	0.24	0.02	0.06	0.05	0.04	0.07	0.04
GMMUS						1	0.83	0.90	0.29	0.02	0.28	0.05	0.08	0.06	0.06	0.08	0.03
GAFUS							1	0.82	0.26	0.025	0.26	0.026	0.06	0.05	0.06	0.07	0.02
GMLUS								1	0.24	-0.01	0.21	0.07	0.09	0.06	0.06	0.08	0.05
EMBUD									1	0.31	0.95	0.03	0.10	0.09	0.08	0.10	-0.04
EMBUT										1	0.32	-0.09	-0.01	0.05	0.05	0.03	0.11
EMBUS											1	0.01	0.11	0.10	0.08	0.11	-0.03
EEMBLN												1	0.17	0.01	0.01	0.01	0.01
IEEMLN													1	0.76	0.76	0.84	0.21
ISDWLN														1	0.96	0.92	0.17
ISDULN															1	0.87	0.19
ISDELN																1	0.24
IUSEGR																	1

Table 5 Distributional properties of daily ETF returns (out-of sample) 04/05.2012 : 23/10/2015

	EEMUS	VWOUS	GMFUS	EWXUS	GURUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	IUSEGR
Mean	-0.00029931	-0.00027	5.0673E-0	-0.00015	-0.00059	-0.00024	-0.00044	-0.00083	0.00009	0.000081	0.00009	0.000151	-0.00015	0.00022	0.00036	-0.00037	-0.00043
Std.	0.011886	0.011892	0.01113	0.010635	0.015228	0.011235	0.014697	0.013471	0.004461	0.0045193	0.00452	0.0086009	0.012279	0.0083806	0.0081727	0.011279	0.01282
Skewness	-0.0019	-0.052	-0.23***	-0.48***	-0.04	-0.18***	-0.08	0.119***	-0.106***	-0.008	-0.05	-0.22***	0.08	-0.19***	-0.07	0.04	-0.21***
Ex.kurtosis	0.98***	0.99***	1.86***	3.54**	1.25***	1.417***	1.2022***	0.70***	6.38***	5.94***	6.30***	2.27***	2.44***	2.51***	3.07	2.73**	2.01***
Jarque bera	37.51***	38.94***	143.11***	521.88***	61.08***	82.93***	57.06***	21.46***	1577.65***	1364.39***	1536.33***	208.71***	231.79***	249.95***	366.08***	289.67***	163.93***
ADF test	-16.12***	-16.24***	-29.44***	-30.14***	-31.21***	-16.40***	-31.72***	-19.57***	-11.22***	-14.50***	-11.45***	-8.37***	-30.40***	-13.01***	-15.92***	-14.74***	-28.71***

Correlation Coefficients, using the observations
5% critical value (two-tailed) = 0.0644 for n = 898

	EEMUS	VWOUS	GMFUS	EWXUS	GURUS	GMMUS	GAFUS	GMLUS	EMBUD	EMBUT	EMBUS	EEMBLN	IEEMLN	ISDWLN	ISDULN	ISDELN	ISDELN
EEMUS	1.00	0.99	0.94	-0.04	0.76	0.96	0.12	0.74	0.48	0.04	0.48	0.12	0.00	0.03	0.02	0.02	-0.03
VWOUS		1.00	0.94	-0.04	0.76	0.97	0.12	0.74	0.49	0.05	0.49	0.12	0.01	0.03	0.03	0.02	-0.03
GMFUS			1.00	-0.03	0.66	0.93	0.09	0.60	0.41	0.05	0.41	0.11	0.02	0.03	0.03	0.02	-0.03
EWXUS				1.00	-0.01	-0.04	0.02	-0.01	-0.04	0.03	-0.03	0.06	-0.03	-0.03	-0.01	-0.03	-0.02
GURUS					1.00	0.75	0.11	0.61	0.48	0.03	0.47	0.04	0.00	0.03	0.01	0.03	0.03
GMMUS						1.00	0.11	0.72	0.48	0.03	0.48	0.11	0.03	0.05	0.04	0.04	-0.01
GAFUS							1.00	0.12	0.06	-0.03	0.06	0.00	-0.01	-0.03	-0.02	-0.02	0.00
GMLUS								1.00	0.45	0.00	0.44	0.13	-0.01	0.03	0.02	0.00	-0.01
EMBUD									1.00	0.01	0.98	0.12	-0.06	-0.04	-0.04	-0.04	-0.03
EMBUT										1.00	0.01	-0.01	0.01	-0.01	-0.03	0.00	-0.02
EMBUS											1.00	0.13	-0.06	-0.03	-0.04	-0.04	-0.04
EEMBLN												1.00	0.09	-0.03	-0.04	-0.03	-0.01
IEEMLN													1.00	0.68	0.64	0.83	0.00
ISDWLN														1.00	0.94	0.81	-0.01
ISDULN															1.00	0.73	0.00
ISDELN																1.00	-0.01
IUSEGR																	1.00

Table 6 GJR-GARCH Model Parameter Estimates $\sigma_{i,t}^2 = \omega_i + \beta_i\sigma_{i,t-1}^2 + \alpha_i\varepsilon_{i,t-1}^2 + \psi_i\varepsilon_{i,t-1}^2 1A_{\{\varepsilon_{i,t-1}<0\}},\ \ i = 1, \dots\ , n$

		Full Sample				In- Sample				Out-of sample			
		Estimate	Std. Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)
EEMUS	μ	-0.0003	0.0003	-1.1133	0.2656	-0.0001	0.0005	-0.1882	0.8507	-0.0003	0.0004	-0.9465	0.3439
	ω	0.0000	0.0000	0.6680	0.5041	0.0000	0.0000	0.7941	0.4271	0.0000	0.0000	1.0830	0.2788
	α	0.0000	0.0157	0.0000	1.0000	0.0000	0.0109	0.0003	0.9997	0.0000	0.0122	0.0000	1.0000
	β	0.9489	0.0156	60.8496	0.0000	0.9334	0.0233	40.0767	0.0000	0.9465	0.0117	81.2404	0.0000
	γ	0.0924	0.0152	6.0991	0.0000	0.1071	0.0435	2.4624	0.0138	0.0882	0.0202	4.3662	0.0000
VWOUS	μ	-0.0002	0.0003	-0.8542	0.3930	0.0000	0.0006	-0.0036	0.9971	-0.0003	0.0004	-0.7988	0.4244
	ω	0.0000	0.0000	0.6337	0.5263	0.0000	0.0000	0.4347	0.6638	0.0000	0.0000	0.4568	0.6478
	α	0.0000	0.0173	0.0000	1.0000	0.0000	0.0101	0.0008	0.9993	0.0000	0.0342	0.0000	1.0000
	β	0.9466	0.0197	48.1057	0.0000	0.9353	0.0384	24.3526	0.0000	0.9376	0.0496	18.8953	0.0000
	γ	0.0947	0.0154	6.1431	0.0000	0.1042	0.0582	1.7883	0.0737	0.0975	0.0293	3.3298	0.0009
GMFUS	μ	0.0000	0.0004	0.0363	0.9710	0.0000	0.0006	0.0104	0.9917	0.0000	0.0003	0.1523	0.8789
	ω	0.0000	0.0000	0.1352	0.8925	0.0000	0.0000	0.2453	0.8062	0.0000	0.0000	6.5935	0.0000
	α	0.0053	0.0631	0.0841	0.9330	0.0089	0.0300	0.2955	0.7676	0.0000	0.0086	0.0000	1.0000
	β	0.9393	0.1156	8.1287	0.0000	0.9366	0.0763	12.2730	0.0000	0.9135	0.0092	99.0688	0.0000
	γ	0.0968	0.0866	1.1184	0.2634	0.0932	0.0756	1.2333	0.2175	0.1152	0.0273	4.2231	0.0000
EWXUS	μ	0.0000	0.0006	-0.0466	0.9629	0.0003	0.0005	0.5069	0.6122	-0.0001	0.0003	-0.2731	0.7847
	ω	0.0000	0.0000	0.1080	0.9140	0.0000	0.0000	0.1713	0.8640	0.0000	0.0000	6.9466	0.0000
	α	0.0120	0.0715	0.1673	0.8672	0.0252	0.0128	1.9661	0.0493	0.0000	0.0075	0.0000	1.0000
	β	0.9390	0.1077	8.7221	0.0000	0.9197	0.1032	8.9122	0.0000	0.9043	0.0135	67.0905	0.0000
	γ	0.0873	0.0657	1.3281	0.1841	0.0792	0.0777	1.0196	0.3079	0.1299	0.0331	3.9186	0.0001
GURUS	μ	-0.0005	0.0004	-1.4480	0.1476	0.0000	0.0010	0.0271	0.9784	-0.0007	0.0004	-1.5482	0.1216
	ω	0.0000	0.0000	1.5678	0.1169	0.0000	0.0000	0.8324	0.4052	0.0000	0.0000	0.4267	0.6696
	α	0.0000	0.0087	0.0000	1.0000	0.0059	0.0264	0.2240	0.8228	0.0000	0.0291	0.0000	1.0000
	β	0.9543	0.0083	114.8073	0.0000	0.9327	0.0177	52.7031	0.0000	0.9622	0.0298	32.3090	0.0000
	γ	0.0770	0.0160	4.7992	0.0000	0.0969	0.0476	2.0350	0.0419	0.0585	0.0177	3.2979	0.0010
GMMUS	μ	-0.0002	0.0005	-0.3734	0.7088	0.0000	0.0005	0.0289	0.9769	-0.0002	0.0003	-0.6563	0.5116
	ω	0.0000	0.0000	0.1155	0.9081	0.0000	0.0000	0.2278	0.8198	0.0000	0.0000	2.0841	0.0371
	α	0.0000	0.0623	0.0003	0.9998	0.0104	0.0250	0.4176	0.6762	0.0000	0.0109	0.0000	1.0000
	β	0.9507	0.0896	10.6128	0.0000	0.9346	0.0862	10.8390	0.0000	0.9254	0.0133	69.5658	0.0000
	γ	0.0861	0.0415	2.0774	0.0378	0.0852	0.0819	1.0401	0.2983	0.1032	0.0244	4.2313	0.0000

Table 5 (Continued) GJR-GARCH Model Parameter Estimates $\sigma_{i,t}^2 = \omega_i + \beta_i\sigma_{i,t-1}^2 + \alpha_i\varepsilon_{i,t-1}^2 + \gamma_i\varepsilon_{i,t-1}^2 1A_{\{\varepsilon_{i,t-1}<0\}},\ \ i = 1, \dots\ , n$

GAFUS	μ	-0.0002	0.0003	-0.4499	0.6528	0.0003	0.0005	0.5281	0.5975	-0.0004	0.0004	-0.9266	0.3541
	ω	0.0000	0.0000	4.6824	0.0000	0.0000	0.0000	3.8940	0.0001	0.0000	0.0000	2.2020	0.0277
	α	0.0000	0.0069	0.0000	1.0000	0.0000	0.0119	0.0000	1.0000	0.0000	0.0129	0.0000	1.0000
	β	0.9434	0.0067	140.3181	0.0000	0.9293	0.0122	76.2660	0.0000	0.9650	0.0096	100.9682	0.0000
	γ	0.0778	0.0170	4.5793	0.0000	0.0973	0.0298	3.2691	0.0011	0.0503	0.0184	2.7397	0.0062
GMLUS	μ	-0.0004	0.0010	-0.4427	0.6580	-0.0001	0.0007	-0.1080	0.9140	-0.0005	0.0009	-0.5433	0.5869
	ω	0.0000	0.0000	0.0694	0.9447	0.0000	0.0000	0.6804	0.4963	0.0000	0.0000	0.0571	0.9544
	α	0.0000	0.1445	0.0000	1.0000	0.0130	0.0255	0.5118	0.6088	0.0000	0.2495	0.0000	1.0000
	β	0.9460	0.2334	4.0533	0.0001	0.9112	0.0261	34.9231	0.0000	0.9500	0.3232	2.9398	0.0033
	γ	0.0952	0.1263	0.7537	0.4510	0.1192	0.0564	2.1126	0.0346	0.0837	0.0742	1.1269	0.2598
EMBUD	μ	0.0003	0.0004	0.8418	0.3999	0.0005	0.0018	0.3022	0.7625	0.0001	0.0003	0.3237	0.7462
	ω	0.0000	0.0000	0.0836	0.9334	0.0000	0.0000	0.0271	0.9784	0.0000	0.0000	0.0981	0.9218
	α	0.0617	0.2438	0.2533	0.8001	0.0559	0.7660	0.0730	0.9418	0.0744	0.2920	0.2547	0.7989
	β	0.7917	0.1096	7.2264	0.0000	0.7807	0.3516	2.2206	0.0264	0.7927	0.0364	21.7661	0.0000
	γ	0.2221	0.4139	0.5367	0.5915	0.2790	1.4297	0.1951	0.8453	0.1548	0.2772	0.5586	0.5764
EMBUT	μ	0.0003	0.0002	1.3277	0.1843	0.0005	0.0012	0.4327	0.6652	0.0000	0.0001	0.2086	0.8348
	ω	0.0000	0.0000	0.2260	0.8212	0.0000	0.0000	0.0453	0.9638	0.0000	0.0000	1.9153	0.0555
	α	0.0665	0.0895	0.7435	0.4572	0.0361	0.4379	0.0825	0.9342	0.1300	0.0329	3.9547	0.0001
	β	0.8046	0.0555	14.4947	0.0000	0.8144	0.0898	9.0713	0.0000	0.7094	0.0409	17.3432	0.0000
	γ	0.1679	0.1236	1.3590	0.1741	0.2385	0.5632	0.4234	0.6720	0.1302	0.0684	1.9023	0.0571
EMBUS	μ	0.0003	0.0001	2.7338	0.0063	0.0006	0.0015	0.3800	0.7040	0.0001	0.0001	0.6745	0.5000
	ω	0.0000	0.0000	0.4496	0.6530	0.0000	0.0000	0.0270	0.9785	0.0000	0.0000	0.1711	0.8642
	α	0.0528	0.0393	1.3445	0.1788	0.0396	0.5369	0.0738	0.9411	0.1138	0.1330	0.8558	0.3921
	β	0.8248	0.0509	16.1895	0.0000	0.8121	0.3908	2.0777	0.0377	0.7538	0.1053	7.1599	0.0000
	γ	0.1790	0.1025	1.7464	0.0808	0.2420	1.1735	0.2062	0.8366	0.1467	0.1862	0.7876	0.4309
EEMBLN	μ	0.0004	0.0002	1.9457	0.0517	0.0006	0.0003	1.6905	0.0909	0.0003	0.0003	0.9940	0.3202
	ω	0.0000	0.0000	0.5855	0.5582	0.0000	0.0000	0.3957	0.6923	0.0000	0.0000	0.2743	0.7839
	α	0.0314	0.0156	2.0180	0.0436	0.0276	0.0304	0.9088	0.3634	0.0290	0.0457	0.6341	0.5260
	β	0.9420	0.0128	73.5489	0.0000	0.9501	0.0318	29.9022	0.0000	0.9283	0.0471	19.7264	0.0000
	γ	0.0398	0.0169	2.3525	0.0186	0.0188	0.0244	0.7684	0.4423	0.0632	0.0246	2.5690	0.0102
IEEMLN	μ	-0.0002	0.0003	-0.4499	0.6528	0.0003	0.0005	0.5281	0.5975	-0.0004	0.0004	-0.9266	0.3541
	ω	0.0000	0.0000	4.6824	0.0000	0.0000	0.0000	3.8940	0.0001	0.0000	0.0000	2.2020	0.0277
	α	0.0000	0.0069	0.0000	1.0000	0.0000	0.0119	0.0000	1.0000	0.0000	0.0129	0.0000	1.0000
	β	0.9434	0.0067	140.3181	0.0000	0.9293	0.0122	76.2660	0.0000	0.9650	0.0096	100.9682	0.0000
	γ	0.0778	0.0170	4.5793	0.0000	0.0973	0.0298	3.2691	0.0011	0.0503	0.0184	2.7397	0.0062

Table 5(Continued) GJR-GARCH Model Parameter Estimates $\sigma_{i,t}^2 = \omega_i + \beta_i \sigma_{i,t-1}^2 + \alpha_i \varepsilon_{i,t-1}^2 + \gamma_i \varepsilon_{i,t-1}^2 1A_{\{\varepsilon_{i,t-1}<0\}},\ \ i = 1, \dots\ , n$

	μ	0.000158	0.000205	0.767648	0.442697	0.000234	0.000459	0.511144	0.60925	0.000148	0.000235	0.627553	0.530297
	ω	0.000002	0.000012	0.130746	0.895976	0.000003	0.000006	0.430931	0.666519	0.000004	0	37.37054	0
ISDWLN	α	0.000003	0.052022	0.00006	0.999952	0	0.022781	0.000004	0.999997	0	0.009528	0.000017	0.999986
	β	0.915415	0.170726	5.361881	0	0.925637	0.032083	28.85149	0	0.827529	0.022818	36.26599	0
	γ	0.142547	0.209095	0.681732	0.495409	0.114851	0.067947	1.690299	0.090971	0.222374	0.050199	4.429805	0.000009
	μ	0.00024	0.000189	1.271273	0.203632	0.000398	0.000321	1.240528	0.21478	0.000208	0./000229	0.909534	0.363068
	ω	0.000002	0.000001	4.0446	0.000052	0.000002	0.000003	0.674117	0.500237	0.000005	0	216.75	0
ISDULN	α	0	0.010668	0.000023	0.999982	0	0.024444	0.000008	0.999994	0.000001	0.004818	0.000117	0.999907
	β	0.882257	0.014338	61.53353	0	0.914763	0.029202	31.32528	0	0.792156	0.021547	36.76358	0
	γ	0.187603	0.029892	6.276016	0	0.136281	0.058528	2.328464	0.019887	0.26808	0.051027	5.253686	0
	μ	-0.00037	0.000388	-0.94962	0.342305	0.000054	0.000525	0.101884	0.918849	-0.00044	0.000348	-1.26442	0.206078
	ω	0.000001	0.000005	0.258357	0.796132	0.000003	0.000004	0.886399	0.375402	0.000002	0.000002	1.06542	0.286686
ISDELN	α	0	0.029272	0.000001	0.999999	0.014619	0.012938	1.12993	0.258506	0	0.015642	0	1
	β	0.951309	0.045478	20.91792	0	0.92813	0.022138	41.92563	0	0.953527	0.018493	51.56157	0
	γ	0.08443	0.028116	3.002947	0.002674	0.090635	0.034917	2.595719	0.009439	0.067222	0.025158	2.672007	0.00754
	μ	-9.3E-05	0.000283	-0.32922	0.741992	0.000174	0.000436	0.398949	0.689931	-0.00026	0.000355	-0.72242	0.470034
	ω	0.000003	0.000003	0.863137	0.388062	0.000003	0.000004	0.782788	0.433751	0.000003	0.000001	2.411548	0.015885
IUSEGR	α	0.022975	0.014485	1.586151	0.112705	0.037187	0.022384	1.661314	0.09665	0.000001	0.008166	0.000155	0.999877
	β	0.92362	0.02692	34.30968	0	0.910581	0.038043	23.93526	0	0.939926	0.008933	105.2209	0
	γ	0.074439	0.027216	2.735153	0.006235	0.074798	0.043033	1.738131	0.082188	0.078934	0.022808	3.460847	0.000538

This table shows the estimation output for GJR-GARCH model.

Table 7 Integrated GARCH (iGARCH) Model Parameter Estimates $\sigma_t^2 = \alpha_0 + (1-\beta_1)\alpha_{t-1}^2 + \beta_1\sigma_{t-1}^2$

		Full Sample				In-Sample				Out-of sample			
		Estimate	std.Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)
EEMUS	μ	0.000133	0.000289	0.461955	0.644114	0.00052	0.000527	0.98619	0.324039	0.00001	0.000355	0.02709	0.978388
	ω	0.000001	0.000012	0.121604	0.903212	0.000003	0.000004	0.79936	0.424083	0.000001	0.000003	0.325469	0.744826
	α	0.083635	0.119177	0.701767	0.482825	0.091448	0.029798	3.06898	0.002148	0.076337	0.030405	2.51063	0.012052
VWOUS	μ	0.00022	0.000286	0.767723	0.442652	0.000582	0.00052	1.11796	0.263586	0.000089	0.00035	0.254367	0.799212
	ω	0.000001	0.000011	0.14062	0.88817	0.000003	0.000004	0.70552	0.480484	0.000001	0.000003	0.351617	0.725126
	α	0.082523	0.10446	0.789995	0.42953	0.08725	0.031929	2.73264	0.006283	0.080432	0.032863	2.447484	0.014386
GMFUS	μ	0.000433	0.000424	1.021521	0.307007	0.000535	0.000511	1.04835	0.294475	0.000396	0.000317	1.250624	0.211072
	ω	0.000001	0.000068	0.019191	0.984689	0.000002	0.000006	0.38551	0.699857	0.000001	0.000004	0.298846	0.765058
	α	0.084172	0.722524	0.116497	0.907259	0.084192	0.04997	1.68486	0.092016	0.091975	0.047978	1.917039	0.055233
EWXUS	μ	0.000343	0.000958	0.357835	0.720467	0.000635	0.000503	1.2613	0.207201	0.000275	0.000271	1.016043	0.309609
	ω	0.000001	0.00007	0.019351	0.984561	0.000003	0.000006	0.52522	0.599429	0.000001	0.000006	0.233641	0.815264
	α	0.085521	0.771684	0.110823	0.911756	0.088278	0.046873	1.88336	0.059652	0.111568	0.093096	1.198411	0.230757
GURUS	μ	-7.1E-05	0.000383	-0.18633	0.852188	0.000774	0.000676	1.1455	0.252002	-0.00037	0.000464	-0.80434	0.4212
	ω	0.000003	0.000006	0.432151	0.665632	0.000006	0.000005	1.21649	0.2238	0.000001	0.000003	0.339401	0.734308
	α	0.077096	0.044154	1.746073	0.080798	0.095422	0.025664	3.71815	0.000201	0.046146	0.017536	2.631512	0.008501
GMMUS	μ	0.000225	0.000344	0.654555	0.512754	0.000524	0.000551	0.94955	0.342342	0.000122	0.000328	0.371094	0.710568
	ω	0.000002	0.000034	0.043748	0.965105	0.000003	0.000007	0.39716	0.691248	0.000001	0.000004	0.304775	0.760537
	α	0.083944	0.352374	0.238225	0.811707	0.086948	0.056982	1.52588	0.127038	0.091492	0.051574	1.773986	0.076065
GAFUS	μ	0.000276	0.000332	0.831999	0.40541	0.000741	0.000502	1.47392	0.140503	-9.2E-05	0.000448	-0.20557	0.837124
	ω	0.000002	0.000005	0.414768	0.678312	0.000004	0.000007	0.55473	0.579082	0	0	0.831993	0.405413
	α	0.069956	0.039352	1.777686	0.075455	0.098313	0.053875	1.82485	0.068024	0.020882	0.002385	8.755782	0
GMLUS	μ	0.000091	0.000503	0.181568	0.855922	0.000564	0.000576	0.9791	0.327531	-0.00013	0.000412	-0.30701	0.758834
	ω	0.000002	0.000018	0.089184	0.928936	0.000004	0.000005	0.7455	0.455972	0.000001	0.000003	0.230465	0.817731
	α	0.07614	0.153213	0.496956	0.61922	0.102519	0.039393	2.60249	0.009255	0.054417	0.026611	2.044933	0.040861
EMBUD	μ	0.000523	0.000142	3.688199	0.000226	0.000813	0.000222	3.66348	0.000249	0.00023	0.000125	1.831359	0.067047
	ω	0.000001	0.000001	0.54142	0.588218	0.000001	0.000002	0.3704	0.711082	0.000001	0.000001	0.71488	0.474683
	α	0.228943	0.05522	4.146043	0.000034	0.215438	0.075966	2.83598	0.004569	0.252638	0.04811	5.251211	0
EMBUT	μ	0.000438	0.000123	3.56849	0.000359	0.000765	0.000195	3.92468	0.000087	0.00013	0.000129	1.01361	0.310769
	ω	0.000001	0.000001	0.598795	0.54931	0.000001	0.000002	0.36441	0.715548	0.000001	0.000001	1.052891	0.292391
	α	0.220927	0.056246	3.927886	0.000086	0.207166	0.06902	3.00153	0.002686	0.303008	0.05287	5.731201	0

Table 6 (Continued) Integrated GARCH (iGARCH) Model Parameter Estimates $\sigma_t^2 = \alpha_0 + (1-\beta_1)\alpha_{t-1}^2 + \beta_1\sigma_{t-1}^2$

EMBUS	μ	0.000489	0.000137	3.580199	0.000343	0.000782	0.000242	3.2322	0.001228	0.000222	0.000127	1.756877	0.078939
	ω	0.000001	0.000002	0.352624	0.72437	0.000001	0.000003	0.27623	0.782369	0.000001	0.000001	0.597792	0.549978
	α	0.195881	0.067024	2.922558	0.003472	0.185361	0.081593	2.27179	0.023099	0.262843	0.060867	4.318284	0.000016
EEMBLN	μ	0.000503	0.000189	2.655878	0.00791	0.000665	0.000337	1.9745	0.048325	0.000424	0.000231	1.838479	0.065992
	ω	0	0.000001	0.33233	0.73964	0	0.000001	0.1898	0.849467	0.000001	0.000004	0.144429	0.885162
	α	0.062112	0.013312	4.665951	0.000003	0.043805	0.006734	6.50502	0	0.081456	0.056687	1.436955	0.150731
IEEMLN	μ	0.000355	0.000291	1.220722	0.222191	0.000743	0.000517	1.43744	0.150592	0.00015	0.000362	0.414788	0.678297
	ω	0.000001	0.000004	0.265577	0.790565	0.000002	0.000009	0.17629	0.860066	0.000001	0.000002	0.509868	0.610144
	α	0.070664	0.040277	1.754458	0.079352	0.07627	0.070398	1.08341	0.278625	0.058865	0.013811	4.26208	0.00002
ISDWLN	μ	0.000492	0.000202	2.430523	0.015077	0.000595	0.000434	1.37017	0.170633	0.000502	0.00024	2.093044	0.036345
	ω	0.000001	0.000005	0.18328	0.854579	0.000001	0.000012	0.10928	0.912978	0.000002	0.00001	0.156949	0.875285
	α	0.088292	0.06543	1.349414	0.177204	0.086718	0.131746	0.65822	0.510394	0.12771	0.1615	0.790772	0.429077
ISDULN	μ	0.000612	0.000195	3.143034	0.001672	0.00074	0.000307	2.40926	0.015985	0.000565	0.000234	2.416561	0.015668
	ω	0.000001	0.000004	0.358433	0.720019	0.000001	0.000003	0.33182	0.740026	0.000003	0.000003	0.963354	0.33537
	α	0.129375	0.072417	1.786537	0.074012	0.10183	0.048338	2.10663	0.035149	0.203875	0.06079	3.353755	0.000797
ISDELN	μ	0.000051	0.000281	0.182093	0.85551	0.000491	0.000508	0.96484	0.334625	-0.00013	0.000344	-0.39009	0.696473
	ω	0.000001	0.000009	0.121391	0.903382	0.000002	0.000005	0.38867	0.697517	0.000001	0.000002	0.27943	0.779915
	α	0.065867	0.077709	0.847614	0.396653	0.07853	0.038461	2.04182	0.04117	0.051144	0.019461	2.627948	0.00859
IUSEGR	μ	0.000176	0.000309	0.569187	0.569229	0.000427	0.000416	1.02533	0.305209	0.000012	0.000346	0.033869	0.972981
	ω	0.000001	0.000059	0.023574	0.981192	0.000002	0.000009	0.20883	0.834583	0.000001	0.000003	0.29706	0.766421
	α	0.07919	0.607061	0.130449	0.896212	0.093131	0.093669	0.99426	0.320096	0.060158	0.025467	2.362202	0.018167

This table shows the estimation output for IGARCH model.

Table 8 Estimated Parameters of Dynamic Conditional Correlation Models $Q_t = (1 - \delta_1 - \delta_2)\bar{Q} + \delta_1(u_{t-s}u'_{t-1}) + \delta_2 Q_{t-1}$

		DCC-GJRGARCH				ADCC-GJRGARCH				DCC-iGARCH			
		Estimate	std.Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)	Estimate	std.Error	t-value	Pr(>|t|)
Full Sample	δ_1	0.014	0.001	8.2	0	0.013	0.001	8.368	0	0.013	0.001	12.53	0
	δ_2	0.970	0.005	179.281	0	0.968	0.006	156.6	0	0.975	0.	1078	0
	δ_3	-	-	-	-	0.002	0.001	1.922	0.054	-	-	-	-
In-sample	δ_1	0.024	0.003	7.384	0	0.021	0.004	5.054	0	0.023	0.004	5.77	0
	δ_2	0.872	0.034	24.96	0	0.877	0.032	27.03	0	0.887	0.028	31.2	0
	δ_3	-	-	-	-	0.008	0.002	3.462	0	-	-	-	-
Out-of sample	δ_1	0.012	0.001	6.554	0	0.010	0.001	5.789	0	0.012	0.001	8.03	0
	δ_2	0.945	0.011	80.54	0	0.941	0.012	72.84	0	0.953	0.007	133.9	0
	δ_3	-	-	-	-	0	0.002	2.669	0.007	-	-	-	-

The table presents parameter estimates for the DCC and A-DCC conditional correlation models. The full sample period is January 5, 2009–October 13, 2015, in-sample period is January 5, 2009–May 3, 2012, and out-of sample period is May 6, 2012–October 13, 2015

Table 9 Empirical Log-likelihood Function and Information Criteria (Model Fit Diagnostics)

Full	LLF	AIC	SIC	Parameters	Inference
DCC-GJR GARCH	112082.8	-126.59	-125.85	240	Time variation
A-DCC-GJR GARCH	112087.3	-106.59	-111.55	241	Asymmetry
DCC- iGARCH	111822.5	-126.33	-125.7	206	Time variation
In-sample					
DCC-GJR GARCH	53594.5	-122.8	-121.48	240	Time variation
A-DCC-GJR GARCH	53598.25	-112.61	-109.38	241	Asymmetry
DCC- iGARCH	53483.8	-122.62	-121.49	206	Time variation
Out-of sample					
DCC-GJR GARCH	59212.91	-131.34	-130.06	240	Time variation
A-DCC-GJR GARCH	59218.18	-103.35	-127.21	241	Asymmetry
DCC- iGARCH	58949.72	-130.83	-129.73	206	Time variation

K is the number of parameters and LLF the log-likelihood function value, AIC is the Akaike Information Criterion, AIC = 2 x k - 2 x ln(LLF), SIC is the Schwarz Information Criterion, SIC = k x ln(LLF) – 2 x ln(LLF).

Table 10 Optimal portfolio with the objective of minimizing portfolio risk under Dynamic conditional correlation models

		Optimal portfolio under DCC-GARCH (GJR-GARCH)						Optimal portfolio under Asymmetric DCC-GARCH (GJR-GARCH)						Optimal portfolio under DCC-GARCH (Integrated GARCH)					
		Full sample (C+I)	Full sample (C)	In-sample (C+I))	In sample (C)	Out-of sample (C+I))	Out-of sample (c)	Full sample (C+I))	Full sample (C)	In sample (C+I)	In sample (C)	Out-of sample (C+I)	Out-of sample (c)	Full sample (C+I)	Full sample (C)	In sample (C+I))	In sample (C)	Out-of sample (C+I)	Out-of sample (c)
Conventional assets	**EEMUS**																		
	VWOUS																		
	GMFUS	2.76%	11.89%					2.33%	11.82%					6.40%	15.33%				
	EWXUS		4.10%	34.80%	37.39%				4.01%	34.84%	37.44%				4.88%	28.17%	30.14%		
	GURUS																		
	GMMUS																		
	GAFUS																		
	GMLUS			4.78%	7.76%					4.40%	7.41%					5.64%	9.08%		
	EMBUD		3.24%				70.70%		3.39%				72.21%		0.17%				93.55%
	EMBUT		32.00%						32.02%						31.86%				
	EMBUS						21.59%						20.38%						
	EEMBLN	10.62%	48.77%	41.32%	50.68%		7.71%	10.31%	48.76%	42.14%	50.92%		7.41%	18.18%	47.76%	45.26%	56.78%		6.45%
	IEEMLN			1.71%	4.17%					1.86%	4.23%					1.78%	4.00%		
Islamic assets	**ISDWLN**																		
	ISDULN	86.62%				100.00 %		87.36%				100.00%		75.42%				100.00 %	
	ISDELN																		
	IUSEGR			17.39%						16.76%						19.16%			
	Total weight	100.00 %	100.00 %	100.00%	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00%	100.00 %	100.00 %	100.00 %	100.01 %	100.00 %	100.00 %	100.00 %
	Mean	0.04%	0.03%	0.06%	0.06%	0.04%	0.01%	0.04%	0.03%	0.06%	0.06%	0.04%	0.001%	0.04%	0.03%	0.06%	0.06%	0.04%	0.01%
	Std.DEV	0.72%	0.59%	0.59%	0.65%	0.70%	0.32%	0.72%	0.59%	0.61%	0.65%	0.70%	0.32%	0.74%	0.60%	0.56%	0.61%	0.90%	0.31%

(C+I) indicates portfolio of conventional and Shari'ah compliant equity ETFs
(C) indicates portfolio of conventional assets only
StdDev Sharpe (Rf=0.1%, p=95%):

Table 11 Optimal portfolio under Mean-Variance strategy

	Full sample (C+I)	Full sample (C)	In-sample (C+I)	In-sample (C)	Out-of sample (C+I)	Out-of sample (c)
EEMUS						
VWOUS						
GMFUS						
EWXUS	3.75%	4.25%	2.45%	2.34%	6.39%	6.89%
GURUS						
GMMUS						
GAFUS	0.29%	0.35%			2.10%	2.32%
GMLUS						
EMBUD	29.82%	36.04%	30.51%	43.50%	1.96%	14.70%
EMBUT	34.63%	38.83%	36.37%	38.88%	35.09%	38.16%
EMBUS	12.10%	11.34%	13.19%	6.34%	34.56%	28.78%
EEMBLN	7.60%	7.46%	8.02%	7.65%	6.26%	5.99%
IEEMLN		1.72%		1.29%		3.16%
ISDWLN						
ISDULN	7.57%		6.32%		8.66%	
ISDELN						
IUSEGR	4.23%		3.14%		4.98%	
Total Weight	100.0%	100.0%	100.00%	100.00%	100.00%	100.00%
Std.Dev.	0.216%	0.23%	0.222%	0.229%	0.197%	0.212%

The table shows the optimal weights under the static Mean-Variance strategy for three research samples using daily data. The full sample period is January 5, 2009–October 13, 2015, In-sample period is January 5, 2009–May 3, 2012, and out-of sample period is May 6, 2009–October 13, 2015. (C+I) indicates portfolio of conventional and Islamic ETFs, and (C) indicates portfolio of conventional ETFs only

Table 12 Performance of DCC/ A-DCC and Mean-Variance Strategies: Modified Sharpe Ratio (mSR)

	DCC-GJRGARCH	A-DCC-GJRGARCH	Mean-Variance	DCC-IGARCH*
Full sample (C+I)	0.048	0.047	0.069	0.052
Full sample (C)	0.056	0.056	0.061	0.055
In-sample (C+I)	0.081	0.081	0.092	0.085
In-sample (C)	0.077	0.077	0.085	0.079
Out-of sample (C+I)	0.053	0.053	0.027	0.053
Out-of sample (C)	0.023	0.023	0.015	0.022

The table shows the modified Sharpe ratios for the optimal portfolios under the dynamic and static strategies for three samples, using daily returns.

The full sample period is January 5, 2009–October 13, 2015, In-sample period is January 5, 2009–May 3, 2012, and out-of sample period is May 6, 2009–October 13, 2015. (C+I) indicates portfolio of conventional and Islamic ETFs, and (C) indicates portfolio of conventional ETFs only

Chapter 4: Systemic Relevance of Islamic Banks in Dual Financial Systems

4.1 Introduction

Islamic banks have been promoted as a safe and equitable banking alternative, which promotes fairness and social welfare. Theoretically, the operations of Islamic banks embrace values such as fairness, avoidance of speculative behaviour and investing in industries in productive activities with real economic value. Over the years, Islamic banks have succeeded in offering financial services and allowing more people to engage with banks and get their money circulated in the economy from “depositors / investors” to “borrowers or entrepreneurs”. These services mainly are very appealing to religiously conscious clients because of their tailored services.

In the previous chapter, I investigated the effect of Islamic ETFs on improving the risk-adjusted returns for a portfolio of ETFs in emerging markets. In this chapter, I continue my investigation but I will focus on the banking side and examine the effect of Islamic banks on systemic risk. Systemic risk is a large-scale disorder, which may happen in the financial system and may affect economic growth and welfare. Literature shows that financial sectors such as the banking, insurance and other financial services sectors have led to an increase in systemic risk. The rational of this research stems from the evident exponential growth rate Islamic banking sector due to the increasing demand for Islamic banks’ services and financial assets, and the growing Muslim population. According to Ernst and Young (2016), Islamic banks have become key players in the banking sector, since they have grown by around 47% since 2014. I argue that this exponential growth would have an effect on the risk of the financial system. Recently, there has been an extensive empirical evidence available about the relative stability of Islamic banks compared to conventional banks during the global financial crisis in 2008 (e.g. Sorwar e al. 2016; Beck et al. 2013). However, the empirical evidence regarding the unaddressed and significant inefficiency, insolvency, withdrawal, operational risks in Islamic banks (e.g. Pappas et al. 2016; Abedifar et al. 2016; Bacha 2008), is alarming in light of their rapid growth rate.

Accordingly, this research contributes to the literature about the Islamic banks' financial instability in two ways. First, to examine the effect of Islamic banks' financial distress on other financial institutions by jointly considering their own specific characteristics, macroeconomic variables and market structure. Previous research has either focused on Islamic banks' characteristics solely, or modelled their propensity to failure risk compared to those of conventional banks. For example, Khediri et al. (2015) find that Islamic banks in GCC countries are liquid, better capitalised, more profitable and have lower credit risk than conventional banks. Abedifar et al. (2013) find no difference between large Islamic and conventional banks in terms of insolvency risk. Gheeraert (2014) and Wanke et al. (2016) investigate the effect of efficiency and market share of Islamic banks on competitiveness and financial innovation. My research is different from these studies in terms of the selection of the possible relevant drivers of Islamic banks' performance. I do not consider only bank-level variables and macro-economic variables, I also take into consideration the linkages and effect of tail-risk spill-overs from and to Islamic banks.

Linkages are one of Reinhart and Rogoff (2009) four “Ls” in financial sectors, which can cause a financial crisis: leverage, liquidity, losses and linkages.

Second, given the estimated financial distress of Islamic banks, I examine the systemic risk relevance of Islamic banks on the financial system in terms of realised systemic risk. Previous research follows a top-down approach, where they analyse the effect of economic stress and financial instability on Islamic banks. For example, Sorwar et al. (2016) study the effect of market risk on conventional and Islamic banks using Value-at Risk (VaR) and Expected Shortfall (ES) as measure of financial distress, and find that the effect is indistinguishable. Bourkhis and Nabi (2013) argue that financial systems’ distress has an equal impact on both conventional and Islamic banks. More particularly, Djennas (2016) find that the up and down movements in the economic activity has significant impact on the efficiency of Islamic banks. Whereas, Beck et al. (2013) and Khan (1991) argue that Islamic banks have better capacity of risk sharing and handle economic stress better than their conventional peers. I contribute to the literature in this research by following a bottom-up approach instead. The advantage of this approach is that I estimate Islamic banks’ financial distress using conditional VaR and given their specific characteristics, macroeconomic variables, and financial system structures. Then, I determine whether their financial distress is systemically relevant. Moreover, I investigate further if there is time-variability in Islamic banks’ effect on the system, due to their own specific characteristics.

The research data consists of weekly balance sheets, macroeconomic and market data of 352 financial institutions in ten majority Muslim countries. The data covers the period from the beginning of 2010 to the end of 2015. This period is important to investigate the systemic risk contribution of the Islamic banking sector, as the sector has exponentially grown after the financial crisis, and this may lead to have more rigorous results about their realised systemic risk. The countries selected met my three selection criteria; they have stock markets, their financial systems include both Islamic and conventional institutions, and the Islamic banking sector represents at least 10% of the total market share.[15]

For the research methodology, I partially follow Hautsch et al. (2015) and Adrian and Brunnermier (2011) methods in estimating Conditional Value at Risk (CoVaR) and network analysis to determine Islamic banks' systemic risk contribution. The difference in my model specification and their specifications stems from the different economic structure of my selected countries (mostly emerging countries) (Mirzaei et al. 2013; Pappas et al. 2016), compared to their analysis of the financial system in the USA.

CoVaR estimation and financial networks structures show that Islamic banks and takaful generally have significant tail-risk spillovers on conventional and other Islamic

[15] The selection is based on the market share not the number of institutions. I select a country if Islamic banks represent at least 10% of total market share of the banking sector (the portion of the market controlled by Islamic banks). Hence, if Islamic banks are few but very large in a certain country, this country would satisfy this selection criteria. In addition, size of Islamic banks is proxied by the logarithm of total assets which is used as a micro-variable for financial institutions investigated in this research. According to my empirical results, size does not have significant effect on the direction of risk channelling and driving financial institutions' distress.

financial institutions. I find that network connections or loss exceedances are the main drivers of Islamic banks financial distress across countries, and this finding is confirmed by my robustness tests.

Regarding the role of Islamic banks in financial networks, I find a variation in the role of Islamic banks in the financial system across countries. I find that there is at least one Islamic bank, which acts as a risk driver or risk channel as conventional banks do within the financial system. Whereas, other Islamic banks appear to act as risk recipients. Furthermore, my research generally finds that Islamic banks contribute to systemic risk as their conventional peers do. The joint significance test shows that most Islamic banks are systemically relevant. I find also a time-variability in systemic risk contribution of a number of Islamic banks due to their own specific-characteristics. I intuitively justify both situations primarily by the insufficient risk management practices Islamic banks have, their limited access to finance due to Shari'ah standards, and the unclear rules and penalties in case of the default of their counterparties. These results are concerning when it comes to the development of the Islamic banking sector, the growing Muslim population and the increasing appetite for Islamic financial instruments. They imply that a close supervision by financial authorities is needed and clear risk management practices in Islamic banks should be enforced. The implications of this research are crucial for economic policy discussions, regulators and risk managers.

In the next section, relevant theoretical background and empirical evidence about the performance of Islamic banks, financial network analysis and systemic risk measurement will be demonstrated.

4.2 Literature Review

Islamic finance has recently received substantial interest from academics, practitioners, and many governments of non-Islamic countries. Islamic banks allow Muslim investors and firms to access financial alternatives, which are compliant with Shari'ah (the Islamic law). The existence of Islamic banks alongside conventional banks creates a dual financial system. This may increase competition, offer better financial services to clients, and provide strategic solutions for poverty problems (Rajan, 2006). In such a system, my main investigation is finding whether Islamic banks increase systemic risk and the size of their systemic risk contribution. The literature behind this question is two sided. One strand of studies compares Islamic banks and conventional banks in terms of many firm-specific characteristics,[16] their role in developing country's financial systems and their performance during financial crises. The other strand of studies about financial networks and systemic risk contribution use various proxies for firm-specific characteristics to determine whether the financial institution is distressed and how much is their systemic contribution. However, there is no bridge between these strands of the literature. Therefore, I expand upon the existing comparison between Islamic banks and Conventional banks to investigate how Islamic banks and Conventional banks work together to either build up or reduce systemic risk.

[16] There are many firm-specific characteristics present in the literature in relation to comparing Islamic banks and conventional banks' performance. These include efficiency, stability, insolvency, maturity mismatch, profitability, and volatility (see Pappas et al. (2016), Abedifar et al. 2016, Abedifar et al. 2013, Khediri et al. (2015), Beck et al. 2013, Gheeraert, 2014, Wanke et al. 2016, Baele et al. 2014, El-Gamal and Inangolo, 2005, Bacha, 2008, Errico and Farrahbaksh (1998), and Saeed and Izzeldin, M (2016).

In the first part of this section, I review studies which compare Islamic banks with conventional banks and form a potential idea about whether or not Islamic banks would increase or decrease systemic risk in financial systems. When it comes to systemic risk measurement, I present in the second part empirical evidence about different systemic risk measures and discuss their advantages and disadvantages.

4.2.1 The Relevance of Islamic banks to Economic and Financial Development

There has been a variation in the effect of Islamic banks on countries' financial systems and economic development. Islamic banks' effect within and across countries has been dependant on their size, efficiency, bank-specific characteristics and cultural and legal limitations. Gheeraert and Weill (2015) find Islamic banking in general improves macroeconomic efficiency. Beck et al. (2013) contrast between Islamic banks and Conventional banks in terms of business orientation, efficiency and stability and find that: i) the business model of Islamic banks is similar to that of Conventional banks, ii) the quality of Islamic banks' assets is higher by investing in real economic activities, and iii) their market capitalisation is bigger. This makes them better off during financial crises. Islamic banks are closer to insolvency than conventional banks. Neither studies however, looked further into the variation cross-country and cross-Islamic banks' characteristics and their effect on financial and economic development.

Abedifar et al. (2016) address the shortcomings of Beck et al. (2013) and Gheeraert, and Weill (2015) by comparing the efficiency of Islamic banks and Conventional banks based on their size (small, medium and large). They study whether or not the coexistence of

Islamic banks and Conventional banks improves countries' financial development in terms of economic growth, income inequality and reducing poverty. Their research focuses on commercial banking with dual financial systems in 22 Muslim countries from 1999 to 2011. They find that there is little relationship between the presence of Islamic banks of any size and economic growth. They also show that there is a positive relationship between the market share of medium size Islamic banks and the mobility of funds, reduction in poverty, and credit allocation, whereas only large Islamic banks improve the efficiency of Conventional banks. The possible explanation for these findings is small Islamic banks may not survive fierce banking competition (Katib and Kent, 2000).

More particularly, when an Islamic bank has not reached a sizeable market share, its effect is negligible. When medium size Islamic banks have bigger market shares, their positive effects on banking system development happens through their transition by increasing i) market penetration, ii) financial innovation, and iii) competition (Gheeraert, 2014; Wanke et al. 2016). First, Islamic banks thrive to expand their market share in the economy, they tend to improve their redistribution of profits from PLS projects to depositors, and tend to ease credit standards for borrowers and entrepreneurs. This may attract clients who used to get services from Conventional banks. Second, Islamic banks cannot develop financial services unless they reach sizeable market share or cooperation with other Islamic banks in a Shari'ah compliant sector. Third, this financial innovation and development can empower Islamic banks' competitiveness. However, when the market share of Islamic banks gets larger, large Islamic banks may find themselves in an unfavourable position due to the competitive pressure from large Conventional banks.

Opposite to Muslim majority countries, Abedifar et al. (2016) find that the banking system is more developed and there is a positive relationship between the presence of Islamic banks and economic growth in countries with religiously diverse populations. Both medium and large Islamic banks improve the efficiency of Conventional banks. The greater the market share of Conventional banks with Islamic windows or branches, the higher their efficiency relative to Conventional banks with no Islamic banking branches or windows. This is due to the competitive pressure to improve their efficiency.

Empirical evidence about the efficiency of Islamic banks relative to Conventional banks is not conclusive. Wanke et al. (2016) compare between domestic and foreign Islamic banks and Conventional banks' efficiency and financial distress in Malaysia. Malaysian domestic Islamic banks are found to be less efficient than domestic Conventional banks, since they had significantly greater loss provision and expenses in relation to their assets, net profits, and equity. The higher expenses result from i) the enforcement of Shari'ah complaint screening by Islamic banks on financial products and services, and ii) the operations of domestic Islamic banks are less leveraged. Wanke et al. (2016) find also that foreign banks - either Islamic banks or Conventional banks - are less efficient than domestic banks, because of the existence of extreme cultural and regulatory limitations against them, which limit their efficiency. The possible explanation for the inefficiency of foreign Islamic banks in Malaysia is due to the significant variation in the Islamic jurisdiction across countries and different social traditions. This greatly affects the Islamic guidelines in relation to the leverage and profit and loss ratios, which Islamic banks should enforce in their financial services and operations.

In a comparison between various types of banks including Islamic banks in Turkey from 1990 to 2000, El-Gamal and Inanoglu (2005) find that there is no considerable difference between Islamic banks and conventional banks. Al-Muharrami (2008) compares Conventional banks and Islamic banks from Gulf Cooperation Council (GCC) countries from 1993 to 2002, and finds that Islamic banks are more efficient than Conventional banks. Baele et al. (2014) conclude that Islamic banks are inefficient because they offer complex Shari'ah compliant financial products and charge higher fees for their services. This is not in line with Abedifar et al. (2013) who find that Islamic banks do not charge rents for offering such products. Moreover, the dual nature of Malaysian banking system makes the profit rates of Islamic banks and Conventional banks highly correlated. In addition, Islamic banks and Conventional banks are not immune against interest rate risks. This explains why the reaction of Islamic banks and Conventional banks to financial distress in Malaysia is similar. These findings are in line with Abedifar et al. (2013), who find no significant difference in the performance of large Islamic banks and Conventional banks in Malaysia.

4.2.2 The Relevance of Islamic banks to Conventional Banking Sector

Gheeraert (2014) measures the effect of Islamic banks and Conventional banks on the banking sector development using private credit (deposits) to GDP ratio in twenty Muslim countries from 2000 to 2005. They find whether Islamic banks have a detrimental or beneficial effect on the banking sector. Their findings show that only medium Islamic banks penetration group has strong complementarity effect on the conventional banking sector. When Islamic banks' market penetration is small or large, their effect is insignificant. The findings by Gheeraert (2014) are similar to those found by Beck et al.

(2000a), Beck and Demirgüc-Kunt (2010) and Wanke et al. (2016), which suggest that a balanced market share of IB and Conventional banks induce banking system development.

For the positives, the existence of Islamic banks in general encourages more people -especially strong believers - to participate in the banking sector, which helps in the overall banking sector development. Religiously concerned clients trust Islamic banks' financial products. This motivates them to increase their money on deposits due to the peace of mind they get (Mckinsey and Company, 2005). In addition, Islamic financial services such as Ijarah or Murabaha result in higher participation in the industry, and induce Conventional banks to expand their financial products to accommodate different clients' needs. On the other hand, Gheeraert (2014) highlights three major negatives of Islamic banking: i) lack of incentive to lend, ii) adverse selection and moral hazard and iii) too high market power. They justify that the conversion of current Conventional banks into Islamic banks and the creation of new Islamic banks may lead to increasing market power of Islamic banks, which may have negative implications if they do not have the incentive to lend. It may affect negatively the development of the banking sector, taking into consideration the long way Islamic finance has to go in order to integrate fully economically and regulatory in any financial system.

4.2.3 Risks in Islamic banks

Literature suggests that Islamic banks may be exposed to more risks than Conventional banks, because they lack liquidity and risk management activities, and their access to wholesale funding is limited. According to Bacha (2008), Islamic banks encounter as many risks as Conventional banks, although Islamic banks emphasise that their operations are interest-free, and they fund profit and loss sharing projects. Clients' deposits are the key source to fund Islamic banks' projects, where Islamic banks intermediate to redistribute the profit rates to depositors and meet any withdrawal request. Islamic banks would be in an unfortunate situation if their projects were not profitable enough and they would face higher credit risk.

Further, credit risk may increase because Islamic banks do not require collateral. In addition, depositors and investors lack knowledge about the function of Islamic loans, making them harder to understand. In addition to that, Islamic banks do not have a clear and unified penalty for default by, and there are moral hazard incentives in case of PLS contracts. Khan and Ahmed (2001) state that Islamic banks are exposed to withdrawal risk because they embrace the concept of profit and loss sharing (PLS). I find this arguable, because of two reasons. First, most Islamic banks in practice do not apply profit and loss sharing (PLS), because they do not have control over a project's management such as the case of 'Mudarabah'. They tend to offer competitive rates of return regardless of the underlying projects' realised performance. Second, the behaviour and religiosity of depositors play a significant role in increasing or decreasing withdrawal and credit risk.

If the second argument holds true, withdrawal risk and credit risk for Islamic banks is assumed less. I should note that non-Muslims may be interested in Islamic banks' services also. However, most investors and depositors in Islamic banks are expected to be more concerned about their religious beliefs than clients of conventional banks. In theory, there is a positive relationship between the individuals' religiosity and their risk-aversion (Miller and Hoffman, 1995; Osoba, 2003). Depositors' behaviour may reduce risky banking lending (Diamond and Rajan, 2000; 2001), because they show loyalty to Islamic banks. Alternatively, other depositors may expose Islamic banks to higher withdrawal risk - eventually credit risk - because they may be more reluctant to keep their deposits in Islamic banks when they perform poorly.

In this regard, Bursztyn et al. (2015) conduct a field experiment in Indonesia - the country with the largest Muslim population - to find whether morality or religiosity encourage Islamic banks' clients to repay their credit card. Their experiment involves sending a reminder to clients to make the minimum payment of their credit card two days before the end of the grace period. In one time, clients receive a text message, which quotes an Islamic religious text stating that non-repayment of debts by someone who is able to repay is an injustice. In another time, clients receive the same reminder but without the religious quote. The results of the experiment showed that a non-religious moral reminder had the same effect as the reminder with a religious quote. This suggests that clients' morality affects their decision to repay their credit cards, not their religiosity. This may contribute to lowering the credit risk of Islamic banks.

More recent empirical evidence shows mixed results about Islamic banks' profitability and risk position in relation to Conventional banks. Abedifar et al. (2013) explore Islamic banks' credit and insolvency risks. They find that there is a significant variation in the performance of Islamic banks across countries. They find that the credit risk of small Islamic banks is lower than that for small Conventional banks. This is because Islamic banks are capitalised better in terms of investing in real productive activities with low uncertainty, and they are less sensitive to domestic interest rate swings because they offer better loan quality. For insolvency, Abedifar et al. (2013) find that Islamic banks are not different from Conventional banks. Basov and Bhatti (2014) find beneficial impacts derived from the limits on the set of Shari'ah compliant investments. These benefits are noticed also by Khediri et al. (2015) who show that Islamic banks are, on average, more profitable, liquid, better capitalised, and have lower credit risk than Conventional banks in GCC countries. This is in line with Olson and Zoubi (2008) who find that Islamic banks are more profitable than Conventional banks in the same region.

In terms of the aggregate propensity of Islamic banks to failure, Pappas et al. (2016) developed a new survival analysis model as a warning system to determine whether Islamic banks' risk of failure is sensitive to bank-specific, macroeconomic and market structure variables. The model recognises failure risk as multifaceted and reflects banks' insolvency risk, withdrawal risk, liquidity risk and operational risk. They performed their analyses on 20 countries in the Middle East and Far East from the period of 1995 to 2010. Overall, they find that Islamic banks are more prone to risk failure due to the adverse effect of their cost-to-income ratio, high operational risk, and liquidity issues. Although, they find that Islamic banks are less risky than their conventional peers are, their results imply that Islamic banks will have a negative impact on the system in the long run due to their own characteristics.

Nevertheless, given empirical evidence regarding the significant inefficiency, insolvency, withdrawal and operational risks in Islamic banks and their effect on banking sector development, there is a research gap regarding the effect of Islamic banks' financial distress on other financial institutions in the system. I question whether Islamic banks' own characteristics drive their financial distress (tail-risk) and lead to affecting other financial institutions distress too. To my knowledge, there is no research so far which addressed the estimation of Islamic financial stress and its effect in financial networks. Therefore, my first hypothesis is:

H: Islamic banks' financial distress affects other financial institutions and has spillover effect in financial systems.

Moreover, Cihak and Hesse (2010) analyse the financial stability of Conventional banks and Islamic banks in terms of their probability of failure in 18 countries. They find that small Islamic banks are financially stronger than small Conventional banks, while large Conventional banks are financially stronger than large Islamic banks. However, the question remains, did they contribute to systemic risk? Thus, Khan (1991) and Beck et al. (2013) build upon the finding of Cihak and Hesse (2010) and examine the theoretical capacity of Islamic banks for handling economic stress. Results show that Islamic banks have better capacity of risk sharing. However, a recent study by Bourkhis and Nabi

(2013) disagree with this proposition. They suggest that financial distress has an equal impact on both conventional and Islamic banks and there is no significant difference in financial stability. It is important to understand the role of Islamic banks' specific risks and the spillover effect of their financial distress on the systemic risk. In fact, numerous studies on financial liberalisation have pointed out the relevance of bank competition to financial stability (Blackburn and Forgues-Puccio, 2010; Manlagñit, 2011). Djennas (2016) assesses the efficiency of Islamic finance in an entire banking system in eight Islamic countries and six newly industrialised countries. He finds that some of the countries, which apply Islamic finance principles, may be unable to access financing sources. Beck et al (2013) and Olson and Zoubi (2008) find that Islamic banks' preclusion of leverage hinders them from achieving similar profitability levels compared to Conventional banks. Islamic banks have to be either involved in risky projects with high return or fail to compete in the market.

However, the effect of the fiscal policy on business cycle volatility;[17] the periodic irregular up and downs movements in economic activity, in the case of Islamic countries is significant. Spillover effects among GCC countries amplify the effect that the fiscal policy of one country has on another. In addition, Islamic countries that are classified as emerging economies, have less efficient economic systems and continue to fail to allocate foreign capital efficiently. The argument of Errico and Farrahbaksh (1998) can reason such inefficiency where Islamic banks bear operational risk because there is no proper

[17] Business cycles are generally measured by the fluctuations in real GDP and in some cases other macroeconomic variables.

supervision and regulations when it comes to business performance and information disclosure. Although this paper is old, its conclusions hold true. For example, Islamic banks are helpless when it comes to the case of default by the counterparty. They are not allowed to charge any accrued interest or impose penalties, except in the case of deliberate negligence. Indeed, the banks' capital during the delay is not productive and its investors and depositors do not earn any additional income.

Furthermore, Sorwar et al. (2016) adopt a top-down approach to investigate the effects of market systemic risk on portfolios of Islamic banks and conventional banks, by considering the capital structure of both types. They use value at risk (VaR) and Expected Shortfall (ES) measures to measure markets' systemic risk. Their analyses cover 20 countries and they find that the market has an equal effect on Islamic and conventional banks. They find that during the financial crisis, Islamic banks are less risky than conventional banks. In addition, the capital structure of Islamic banks is significantly different from their conventional peers, because of their lower dependence on leverage. This implies that traditional capital structure models may be "unfair" to Islamic banks, because according to Sorwar et al. (2016) they might magnify the leverage levels in Islamic banks.

Overall, previous research focuses on the effect of economic stress, financial instability and market risk on Islamic banks. Researchers mostly followed a top-down approach in their analyses. However, there is a gap in the literature when it comes to investigating the relevance of Islamic banks to the financial system, and investigating their systemic risk contribution. I contribute to the literature by estimating the realised systemic risk of Islamic banks, and determine their systemic relevance accordingly. So, I hypothesise that:

H2: Islamic banks are relevant to the financial system and contribute to its systemic risk.

Moreover, empirical evidence has shown a variation in Islamic banks' performance during both financial distress and tranquillity. I argue that they may be due to the previously outlined risks in Islamic banks, which are more accentuated when markets are recovering and there is a relative economic stability.

H3: There is a time-variability in the effect of Islamic banks on the system due to the variation in their business performance and bank-level characteristics.

In the next section, I demonstrate the relevant literature review regarding the development of systemic risk measures. In addition, I discuss the recent studies quantifying systemic risk contributions of financial institutions alongside financial network analysis.

4.2.4 Systemic Risk: Institutions' Relevance and Contribution

The financial system's proper functioning is vital for economic growth and welfare. It helps to circulate money within the economy between lenders / investors and borrowers. A disorder in the financial system can deter the efficiency of this flow and increase systemic risk. It is essential to understand the definition of systemic risk that I will use in this research. The European Parliament (2011) defines systemic risk as the probability of an event to unsettle the entire financial system including the real economy and the financial markets. In other words, a disorder may start from a single institution or specific sector, and subsequently lead to the collapse of other financial institutions in the financial system. The difference between systemic risk and systematic risk is that the latter represents the probability of turbulence or instability in specific market or industry risk. Whereas systemic risk refers to the contagion effect of a financial institution's distress to other institutions due to for example banks' vulnerability to a lack of depositors and to the default of borrowers.

In recent years, systemic risk has gained a considerable importance in the economic policy discussions especially after the global financial crisis. In their survey on systemic risk, Benoit et al. (2016) explain how malfunctions in the system are caused by factors on the macro and micro levels. The macro factors include but are not limited to: the macro imbalances in the private or public sector, the strong correlation in portfolio exposures due to herding behaviour, contagions, asset bubbles, negative externalities (some banks are too big to fail), and information discrepancies when for example the interbank market freezes. On the micro level, the persistent financial distress of financial institutions can trigger a crisis in the system. Given the definition of systemic risk and the macro and micro factors, the Dubai debt crisis[18] for example was not systemic, because the shock waves affected few GCC[19] markets. However, the failure of Lehman investment bank in 2008 was an event of systemic risk. It affected a wide range of financial institutions and put their viability in question. This was due to the low quality of subprime mortgages, and their mutation into derivative products.

4.2.5 Financial Network Analysis and Systemic Risk

Since the factors leading to systemic risk can be macro or micro, the existing literature proposes a large number of measures of systemic risk. These measures try to model economic meltdowns and are intended to prevent future financial crises. In this section, I review the development of the relevant systemic risk measures to my research objectives.

There are two types of systemic risk measures: "top-down" and "bottom-up" measures. Bisias et al. (2012) and more recently Benoit et al. (2016) present comprehensive surveys about measuring systemic risk. The top-down measure determines the effect of distress at the level of the financial system on one or more financial institutions. The bottom-up approach on the other hand determines the systemic risk contribution of one financial institution or sector's distress to the financial system.

[18] Dubai debt crisis was due to Dubai World's (giant conglomerate owned by Dubai government) delay to repay $26 billion (USD) to Sukuk holders on time in end of 2009.
[19] Gulf Cooperation Council (GCC) is a political and economic union between Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman, which was established in 1981.

a) Top-Down Systemic Risk Measures

There are different top-down measures which are used to determine the stability and viability of the financial system. Credit default swaps (CDS) spreads are one of the commonly used and a good estimator of systemic risk (Rodríguez-Morenoand Pena (2013). Researchers have used CDS data differently. For example, Segoviano and Goodhart (2009) use CDS data to construct a banking stability index to estimate the interbank dependence on tail events. Huang et al. (2009) construct the distress insurance premium (DIP) which determines the required insurance premium to cover distressed losses in the banking system. However, the problem with using CDS data is that it is not always indicative of financial system viability, especially where there is a duality between conventional and Islamic banks, such as in many developing countries. In addition, some developing countries do not work with or use CDSs.

The second mostly used top-down measures of systemic risk are principal component analysis (PCA) and Granger causality. They are used to reflect and capture the interconnectedness and spillover effects between financial institutions. Billio et al (2012) use these tests to examine the interconnectedness between different financial sectors such as depositors, banks, insurers and other financial institutions. Moreover, Acharya et al. (2010) and Brownlees and Engle (2012) introduce the Systemic Expected Shortfall (SES), and Systemic Risk measure (SRISK) respectively to model the downside risk of a single financial firm in the event of market turmoil. Simply put, they measure the expected loss of each institution conditional on the poor performance of an entire set of institutions or of a specific market. The use of the top-down approach is however not appropriate for this research, because I am trying to find the systemic risk contribution of

Islamic banks to the overall system. The bottom-up approach is most suitable to my research questions and the reasons are explained in the following section.

b) Bottom-Up Systemic Risk Measures

Bottom-up systemic risk measures capture the financial distress at the institutional level and identify the significance of its contribution to the financial system. These measures are useful in providing a warning for a possible financial crisis by knowing institutions' distress status. Since I will examine the effect of the Islamic banking sector on the financial system, I will use marginal Conditional Value at Risk (ΔCoVaR) as the bottom-up systemic risk measure. Adrian and Brunnermeier (2010) who developed it initially, also proposed the development of Conditional Value at Risk (CoVaR). They started measuring and defining financial distress as when one financial institution is at its VaR and start affecting other institutions VaR level. If one institution's VaR level exceeds its standard or benchmark level, it is considered to be financial distressed and will start affecting other institutions.

However, if financial distress is solely dependent on VaR, CoVaR will not capture any increase in systemic risk in non-crisis or low volatility periods. This is simply because VaR is dependant and volatility levels and correlations between different sectors tend to be higher after volatility shock, not before. More particularly, if there is financial innovation, there will be new connections in the financial system, which may not have experienced simultaneous losses yet. On the other side, if the market is booming, volatility levels are relatively lower than that when there is market turmoil. Therefore, volatility estimates will be low until a volatility shock happens. This means that a measure relying on volatility estimates will fail to provide the analyst with an early warning.

From this point, many studies have tried to enhance CoVaR's ability to capture an institution's financial distress. Girardi and Ergun (2013) modify the definition of financial distress proposed by Adrian and Brunnermeier (2010). The former argue that an institution will be financially distressed when it is close to its standard VaR, rather than being at its VaR. They find that CoVaR fails to detect systemic risk where it is most pronounced, and any financial regulation based on CoVaR with this distress definition could introduce additional instability and set wrong incentives. This implies that their modification would help in providing better and earlier warning for any financial institutions' distress. Rodríguez-Moreno and Pena (2013) use also CoVaR and aggregate CoVaR to measure the ability to extract the distribution stress in institutions' information, and to calculate the system's total risk respectively. They find that these are the worst among systemic risk measures based on structural credit risk models. This is because in non-Gausian setting, tail dependence makes system's risk lower than in the Gaussian setting (Puzanova and Düllmann, 2013).

Other studies also proposed extensions to CoVaR such as asymmetric CoVaR, which considers both positive and negative returns (both sides of tail distribution). López-Espinoza et al. (2012) investigate 54 large-scale complex international banks and a large sample of U.S. banks in order to evaluate their contribution to the risk of their respective financial system. They find that asymmetric CoVaR does not underestimate systemic risk compared to original CoVaR. Whereas, Adrain and Brunnermeier (2011) themselves modify their own CoVaR measures to become marginal conditional value-at-risk (ΔCoVaR). It takes take in consideration not only of the CoVaR, but also its marginal change across institutions and during different time. They use quantile regression to estimate their conditional models and decide whether firms' specific characteristics contribute to the entire financial system's systemic risk. Using data from 1986 to 2010 for 1266 financial institutions in the US, they find that size, maturity mismatch, leverage and market to book value ratio contribute significantly to systemic risk. Roengpitya and Rungcharoenkitkul (2011) utilize Adrain and Brunnermeier (2011) ΔCoVaR to quantify the spillover effects of six Thai commercial banks in the Thai financial system. They find that individual banks have different impacts on the entire system; whereas larger banks contribute more to systemic risk than smaller ones. Bernal et al. (2014) also investigate the systemic risk contribution of the banking, insurance, and other financial sectors in the Eurozone and the United States, and rank financial institutions according to their contribution to systemic risk. They use also the ΔCoVaR, which relies on high frequency data because it is a very responsive measure of distress with a particular financial sector. They validate their analysis by using the Kolmogorov-Smirov (KS) test to determine whether a given financial sector contributes significantly to systemic risk.

In addition, Wong and Fong (2011) test the ΔCoVaR by investigating the linkage between eleven economies in Asia-Pacific countries and estimate the ΔCoVaR for the CDS of Asia-Pacific banks. Their results mostly indicate that ΔCoVaR value is higher than traditional VaR. This implies that ΔCoVaR captures the effect of the linkages between economies and explain Asia-pacific banks' financial distress accordingly.

In light of quantifying the systemic risk contribution of an institution, there have been numerous advancements in the last decade. For example, Abadie (2002) uses a bootstrapping procedure to test whether or not the systemic risk contribution of two banks is equal. His findings indicate the US insurance industry is the riskiest because its non-core activities have increased marginally over the last decade. Castro and Ferrari (2014) propose a dominance test to evaluate whether or not a particular bank contributes more to systemic risk than another bank.

Most recently, Hautsch et al. (2015) take into consideration CoVaR disadvantages mentioned and pointed by López-Espinoza et al. (2012), Girardi and Ergun (2013), Rodríguez-Moreno and Pena (2013) and present a methodology which uses network analysis with systemic risk contribution measurement. It results in a clear multi-dimensional interconnected network that shows the direction and the magnitude of the spillovers between financial institutions and the system in. This advances the work by Diebold and Yilmaz (2012) which shows the relations only on a pairwise basis, by measuring the transmission of volatility spillover from one market to another.

Moreover, Hautsch et al. (2015) present a new concept which is called "realised systemic risk beta", which accounts for deviations in institutions' marginal systemic relevance based on the variation of the firm-specific variables. Their method concentrates on the extreme left tail quantiles rather than the mean of the returns distributions. They follow Adrian and Brunnermier (2011) to construct a tail risk financial network based on firms' specific characteristics, and quantify the systemic risk contribution of significantly interconnected institutions. They use market and balance sheet data for depositors, brokers/dealers, insurers and other firms in the US, and find that the insurance companies are the riskiest. I use the approach proposed by Hautsch et al (2015), because measures such as the SES, SRISK or earlier mentioned forms of CoVaR cannot capture the spillover effects driven by the relationships depicted in risk networks and may underestimate the systemic risk contribution when financial institutions are highly interconnected.

In the next section, I explain the selection of research data and how I utilise Hautsch et al. (2015) proposed model in Majority Muslim countries.

4.3 Data

This research has three main objectives; i) identify the effect of the interconnectedness between Islamic banks, other financial institutions on the financial network structure and ii) determine the systemic relevance of Islamic banks and other institutions and quantify their systemic risk contribution; iii) test for time-variability in the effect of Islamic banks on the financial system. Therefore, the research data includes institution-specific characteristics and macro-level variables in the sampled countries. Previous evidence such as provided by Demirgüç-Kunt and Detragiache (1998), Männasoo, and Mayes (2009) has shown that there is a positive relationship between economic downturns and banks' financial stability. Also, incorporating the accounting profiles for financial institutions helps in predicting their financial distress and propensity to failure. For example, Männasoo, and Mayes (2009) found a significant relationship between banks' operational risk and leverage levels in European economies, and Lane et al (1986) find that using indicators for leverage ratios, liquidity and earnings helps in providing an early warning for banks' distress in the US.

Accordingly, the advantage of my selected variables is that it enables us to estimate Islamic banks' financial distress using conditional VaR, then determine whether their financial distress is systemically relevant and investigate any time-variability in Islamic banks' effect on the system, due to their own specific characteristics. I follow the literature and select the possible risk drivers of Islamic banks' financial distress. Pappas et al.

(2016) stress on the importance of incorporating bank-specific characteristics, which consider the distinct features of Islamic banks.

I employ four main criteria to select a representative sample. First, I select countries with majority Muslim populations. Second, the selected country must have a dual financial system (with conventional and Islamic banks). Third, Islamic banking sectors should represent at least 10% of the total number of institutions available and selected for this research. Fourth, the country must have a stock exchange. I disregard countries such as Yemen, because they do not have a stock exchange during the sample period, and Iran, because it has only an Islamic banking system in isolation.

Therefore, my research data consists of 10 sampled countries: Abu Dhabi, Bahrain, Dubai, Indonesia, Jordan, Malaysia, Oman, Pakistan, Saudi Arabia and Turkey. The list of institutions differs across countries due to the differences in the leading sectors in the financial system. Table 1 (p. 154) shows the number of providers of Islamic banking services and Table 2 (p. 206) shows the institutions' acronyms used in this research.

My research sample contains total 352 institutions. The institutions included are conventional banks, brokers, investment banks, insurers, and Islamic institutions. I do this to capture the real dynamic in financial systems, where conventional and Islamic financial institutions co-exist. In addition, it is common in countries such as Malaysia and Indonesia to have Islamic and conventional banks co-existing in one holding company. My sample includes 68 Islamic financial institutions, which are fully-fledged Islamic banks[20], banks with either Islamic windows or branches, or Islamic insurance (Takaful). These represent 19% of the total number of institutions. After extensive filtering of institutions and countries, this sample is considered more representative of the Islamic banking sector compared to other studies in the literature. This is because the study by Čihák and Hesse (2010) involves 77 Islamic institutions which represent 16% of total samples, whereas Beck et al. (2013) have 88 Islamic institutions, which represent 17% of their total number of institutions.

I use publicly available equity market, macroeconomic and balance sheet data. I obtain weekly data for the above variables from Bloomberg, DataStream and World Bank. I account for listed institutions in the countries' stock markets and exclude any delisted institutions during the sample period. This criterion excludes institutions if an institution was delisted, merged, acquired or defaulted at the middle of the sample period. [21]

Given these conditions, I capture the general state of the economies by considering a set of lagged macroeconomic variables, $M_{t-1,}$ as suggested and used by Hautsch et al. (2015) and Adrian, and Brunnermeier (2011). As Table 3 shows, my selected variables are partly different from those selected by Hautsch et al. (2015) and Adrian, and Brunnermeier (2011), due to the differences between the underlying economies of the sampled countries

[20] Islamic banks are defined as banks whose financial services and operations are subject to Shari'ah standards (Gheeraert, 2014). Islamic windows (a subsidiary of a conventional bank or a department) are included as long as it has its own balance sheet data and equity market data.
[21] This selection criterion may raise the issue of "survivorship bias" in the results, because the financial distress of the institutions which survived during my sample period may be lower than the financial distress of the excluded institutions. However, this criterion is required as suggested by Hautsch et al. (2015) and Wang et al. (2016) to estimate loss exceedances and CoVaRs for the selected institutions.

and the USA economic system. The American economy is a developed economy, which has the power to manage and control the money supply of the most traded currency in the world (USD). Hence, the use of many liquidity indicators is essential to identify the stability of the American economy. The closest liquidity indicators to the ones suggested by the studies above are in Table 3 (p. 165). The selection of liquidity indicators in each country is controlled by: i) the differences in the economic structures amongst my selected countries, and ii) the availability of data. This explains the slight variation in variables across countries.

Table 1 Total Number of Institutions					
Country	Islamic Banks	Institutions with Islamic Windows	Islamic Insurance	Conventional Institutions	Total
Saudi Arabia	4	2	3	40	49
Turkey	3	4	-	31	38
Malaysia	5	-	-	30	35
Abu Dhabi	3	-	3	23	29
Dubai	3	-	4	17	24
Oman	2	1	-	26	29
Jordan	3	-	-	33	36
Pakistan	6	-	-	10	16
Indonesia	8	5	-	61	74
Bahrain	7	1	1	13	22
Total	44	13	11	284	352

I obtain weekly equity prices from Bloomberg terminal to calculate their weekly logarithmic returns. Additionally, I utilise the return for the major sector in each country, where the economy is either an emerging or a frontier economy whose income is highly dependent on natural resources or specific industrial sectors. For example, oil represents the main income source for Saudi Arabia, Abu Dhabi, Dubai and Oman, palm oil plantation for Malaysia, and energy and utilities industries for Saudi Arabia. I also use - where available - the weekly spread of credit default swap (CDS) of the country, change in budget balance to GDP, change budget debt to GDP and international reserves alternatively. I interpolate[22] any monthly, quarterly or yearly data into weekly data. Implied volatility represents the aggregate volatility for all assets in a given country's market. It implies the willingness and trust of investors to invest in the country's stock market. Interbank rate and spread of credit default swaps (CDSs) imply confidence in the capa-

[22] I perform linear interpolation by approximating values between two known data points using polynomial function. This helps in smoothing the estimation of the effect of the balance sheet (micro) variables on an institution's VaR.

bility of the government to repay the loans. The international reserve is a proxy for the country's liquidity in terms of foreign currency.

Highlights of The Countries' Financial Sector

- General background about the economies of Gulf Cooperation Council Countries (GCC)

GCC countries are large producers and exporters of oil. Their banking sector is young as the oldest bank was established in 1950s. Most banks are privately owned, but the public sector has a substantial role in the banking industry. The public sector can have equity participation in the private banks, or establish financial credit institutions to provide finance to private and public institutions at a discounted rate. Currencies in the region are pegged to the US dollar, which is why the central bank has a limited role to play in setting monetary policy and controlling interest rates. However, some monetary and credit controls are exercised through its sale and purchase of certificates of deposits.

The ownership of financial institutions in the region is limited to a few shareholders (families). This happens in order to limit any unforeseen disadvantages of corporate control. The banking sector in GCC countries in early 21st century used to be fragmented and unable to consolidate financial institutions that can be a force in the Arabic region and on the international level. According to Al-Muharrami et al. (2006), the banking system in the GCC faces diseconomies of scale and there is a significant market share effect on their returns on assets.

Moreover, since GCC countries are large producers and exporters of oil, there has been extensive evidence about oil price performance as a driver of business and financial variables in their economies (Callen et al. 2015). High oil prices and an increase in short-term capital inflows leads to higher liquidity, more government spending, higher non-oil output growth and boom in asset prices. For example, in Oman, there was a sharp increase in household leverage in the period between 2004 and 2008 (Prasad and Bologna, 2010). In oil price downturns and after the global financial crisis, these effects can be retracted and the systemic risk of the financial sectors can rise and have negative effect on the real economy in the GCC region.

With regard to Islamic finance, there are no national Shari'ah authorities to oversee the performance of Islamic financial institutions in GCC countries. In GCC, the central bank/monetary agency only give the licence to Islamic banks. Each financial institution (bank) has its own board which can issue laws and provide advice on the financial products offered.

Next, I provide a summary about each country financial sector is provided.

1. Saudi Arabia

Saudi Arabia is a member of GCC. It accounts for 55% of oil reserves and over 59% of GCC's GDP (Mason, 2014). The banking sector in Saudi Arabia is considered to be the largest in terms of asset size, asset concentration per bank and number of branches. The banking system operates in conditions of perfect competition. It is important to note that the three largest banks (National commercial bank, Samba financial group and Al-Rajhi) own 45% of the total assets in the sector (Al-Hassan et al. 2010). Also, the public sector has an extensive ownership in the largest banks. This indicates the capital flows are mostly circulated and managed either by the government or wealthy families. Commercial banks in Saudi Arabia are depository banks and are separated from non-banking commercial activities such as securities market and real estate brokerage. The rest of the financial sector comprises credit institutions' share of the financial sector is approximately half the size of the banking sector which offer interest free loans to public and private institutions. It also comprises autonomous government institutions, which dominate the primary market for government securities. Finally, the non-banking institutions represent marginal share in the Saudi financial system.

2. The United Arab Emirates (UAE) (Abu Dhabi / Dubai)

The UAE is a member of GCC and consists of seven separate federal emirates: Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Qaiwain, Ras Al Khaimah and Fujairah. According to Al-Muharrami et al. (2006), UAE operates in conditions of perfect competition and the banking system is the least concentrated. Abu Dhabi and Dubai have independent stock exchanges (Abu Dhabi Securities Exchange and Dubai Financial Market) and have emerged as the most important emirates. Each emirate has its own economic and political characteristics. For example, Abu Dhabi has the largest oil and gas wealth which represents approximately 90% of the total oil product of the country. Dubai is considered the centre and destination for financial services institutions. The UAE banks, along with Saudi Arabian and Kuwaiti banks, have dominated the GCC and Middle Eastern banking sectors. Bank ownership is predominantly owned by the government. However, the banks in the UAE -unlike Saudi Arabia- are not separated from non-banking commercial activities.

The largest banks in UAE are National Bank of Abu Dhabi, Emirates international bank and Abu Dhabi commercial bank. Moreover, UAE is a prominent provider of Islamic financial products. It has two large Islamic mortgage finance companies which represent together aroun16% of banks' officially reported real estate lending and 3% of private sector credit (Al-Hassan et al. 2010). Despite the homogeneity between GCC countries and the significant political and economic affiliations, GGC countries' laws restrict intra-region banking. For example, the UAE banks' presence in the GCC countries is limited to a branch in each Qatar and Oman and two overseas banking units in Bahrain.

3. Oman

Oman has the smallest banking sector amongst GCC countries, where the economy in Oman was not identified as perfect competition or monopolistic, since the largest government projects are directly financed by foreign banks (Al-Muharrami et al. 2006). Nonetheless, there are two banks (Bank Muscat and National bank of Oman) controlling over 55% of the sector's assets. This makes the banking system highly concentrated (Al-Hassan et al. 2010). Oman is the only GCC country which follows Islamic Financial Services Board (IFSB).

4. Bahrain

Similar to UAE, Bahrain's retail banking sector is the least concentrated amongst the GCC systems. It operates in conditions of monopolistic competition. The three largest retail banks (Bank of Bahrain and Kuwait, National bank of Bahrain, and Ahli United Banks) control 41% of the total sector's assets. In addition, Bahrain has the largest wholesale banking sector (Al-Muharrami et al. 2006). It offers off-shore investment, investment banking and financing corporations in other GCC countries. This exposed the wholesale banking sector to a considerable hit by the global financial crisis (Al-Hassan et al. 2010).

When it comes to Islamic finance, Bahrain has its own the Shari'ah board: Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). It issues Shari'ah standards which focus on the practical issues related to Islamic financial products. AAOIFI overlaps with the Organization of the Islamic Conference (OIC) Fiqh Academy in Jeddah. However it is arguably the most referenced institution in terms of Shari'ah standards from a practical perspective. The AAOIFI Shari'ah scholars are the reference regarding the financial products offered in local banks and their subsidiaries overseas.

5. Turkey

According to Investment Support and Promotion Agency of Turkey (2016), the banking sector dominates the Turkish financial system, since it accounts for over 70% of overall financial services. Turkey has been implementing regulatory and structural reforms since early 2000's financial meltdown. This has mitigated the negative effects of the global financial crisis. Turkey is characterised by good liquidity conditions due to its expanding loan base. This allowed the financial sector to maintain a steady growth rate in terms of asset size and equity structure. Turkey has a diversified economy. It is a free market economy, where service and industry sectors are its key drivers according to The Central Intelligence Agency "CIA" World Factbook. (2017). Turkey's two largest banks are State-owned bank Ziraat and İş Bank.

Islamic finance in Turkey started in 1980s and used to be named "Special Finance houses". The name changed in 2005 to "participation banking". The Turkish government has been reluctant to expand Islamic banking services due to its secular nature, and its growth rate has slowed down since the European debt crisis (Hardy, 2012). However, it has welcomed Islamic banks from GCC countries (Albaraka Banking Group and Kuveyt Türk) to open branches in Turkey.

6. Jordan

Jordan has one of the smallest economies in the Middle East. Its economy is characterised as a free market economy with strong reliance on foreign assistance and foreign investment. The banking sector in Jordan is a strong pillar in its financial services sector and helped the sector alongside the central bank of Jordan to remain resilient in the face of regional volatility (Oxford Business Group, 2016). The banking sector in Jordan was established in 1948. The largest bank in Jordan is Arab bank. There are regional banks such as the Kuwait National Bank, Egyptian Arab Land Bank, Bloom Bank and National Bank of Abu Dhabi; and Western multinationals such as Citibank, Bank Audi and Standard Chartered. Jordan has four Islamic banks: Jordan Islamic Bank (JDIB,), Al Rajhi Bank and Islamic International Arab Bank. There are initiatives under the ownership of the government, to support expanding Islamic finance. According to Reuters' 2015-16 "State of the Global Islamic Economy", Jordan is ranked the ninth among the top-10 Islamic finance industries globally. The other segments (insurance and capital markets) contribute marginally to the financial services sector compared to the banking sector.

7. Malaysia

According to the CIA World Factbook,(2016) Malaysia has transformed itself since 1970s from raw materials producer to a multi-sector economy. It is an open economy which witnessed resilience in the face of the global financial crisis. The financial sector played an important role in supporting the Malay economy. National Banks are well capitalised the central bank (Bank Negara) maintains adequate foreign exchange reserves. After the Asian financial crisis in the late 1990s, Bank Negara has developed clear and equitable and adequate regulations which limit Malaysia's exposure to riskier financial products. This has helped the economy to witness a reduction in poverty and strong momentum in country's GDB due to the robust demand for the financial services. The financial services sector has one of the highest levels of inclusion in the world (World Bank, 2013) since it offers a wide range of innovative services such as microfinance, special loans and financing for small and medium businesses. However, the country has strict supervisory and operational regulations for foreign financial institutions. This may limit foreign banks efficiency.

Moreover, Malaysia is a leader in Islamic finance. It has been developing a whole regulatory system to govern Islamic banking and support the real sector. There are national Shari'ah boards which serve the central bank and securities commission. The Kuala

Lumpur-based Islamic Financial Services Board (IFSB) is responsible for issuing rules or standards regarding Islamic financial products.

Recently, Malaysia has started sharing its experience in enhancing regulatory policies with other developing countries. It established the Association of Southeast Asian Nations (ASEAN) in 2015 along with nine other ASEAN members in order to help mitigate risk against any potential crisis and promote economic integration.

8. Indonesia

Indonesia has the largest economy in Southeast Asia. However, its financial sector is small compared to its regional peers. The Indonesian financial sector suffers from inadequate regulatory framework which is not in line with global supervisory and regulatory practices. It is less diverse than the Malay sector due to the limited financing alternatives to the Indonesian population. It does not offer sufficient life wealth options through savings or investments to mitigate financial wealth. The banking sector is also dominated by a handful of institutions. This played a role in locating rural regional banks in specified and concentrated in predetermined geographical areas (Ismail, 2016).

Moreover, Indonesia has an open capital account which contains substantial foreign bonds and equities. This threatens the financial system and increases its systemic risk in case of an external shock and foreign capital outflow. The largest banks in Indonesia are Bank Mandiri, Bank Rakyat Indonesia and Bank Central Asia

The country has the largest Muslim population which can form a strong demand for Islamic finance. Islamic banking and Sukuk are reasonably developed and are widely growing. The market share of Islamic banks in terms of Shari'ah compliant assets accounts for half of total Shari'ah compliant assets in Indonesia. This makes the banking sector in Indonesia the largest contributor to the financial system and it is followed by Sukuk, funds and insurance firms (Oxford Business Group, 2016).

9. Pakistan

According to IMF (2004), the banking sector in Pakistan has witnessed a considerable privatisation of its public sector commercial banks along with liberalisation of the financial system and allowing domestic and foreign competition. Private banks have grown rapidly since 1990s. Overall, the market share of state-owned commercial banks dropped dramatically over the last two decades. Local private banks' market share (Muslim Commercial Ban/k (MCB), Allied Bank (ABL), United Bank (UBL) and Habib Bank (HBL) has exceeded state-owned commercial bank (National Bank of Pakistan (NBP). This happened because the government thought to consolidate the banking sector by raising the minimum capital requirement.

Pakistan has an encouraging environment for Islamic banking sector. The central bank (the State Bank of Pakistan) offered flexibility for Islamic banks in terms of opening new banks and branches. The first fully fledged Islamic bank is Meezan bank which was established in 2002.

Table 3 Selection of macro-level variables (M_{t-1})
Adrian Brunnermeier (2011)
Implied volatility index (VIX) Short-term liquidity spread: the difference between 3-month collateral repo and 3-month treasury bill rate Change in 3-month treasury bill rate Change in the slope of the yield curve: the difference between 10-year treasury bill rate and 3-month treasury bill rate
Hautsch et al. (2015)
Implied volatility index (VIX) Short-term liquidity spread: the difference between 3-month collateral repo and 3-month treasury bill rate Change in 3-month treasury bill rate Change in the slope of the yield curve: the difference between 10-year treasury bill rate and 3-month treasury bill rate Credit spread: the between BAA rated bonds and treasury bill rate and both have 10-year maturity Equity market difference return Real estate sector 1-year cumulative return
My Research
Abu Dhabi Implied volatility index: USDAED Implied Volatility) (IVOL) Change in 3-month interbank rate Change in UAE budget balance as percentage of GDP (BUDGET/GDP) Spread of UAE CDS (CDS) Rate of UAE interest rate swap Market equity return: ADSMI Index Change in crude oil price (OIL) Return of Abu Dhabi banks Index Return of Abu Dhabi real estate Index **Bahrain** Implied volatility index: BHSEASI Index Historical Vol (IVOL) Market equity return: Bahrain securities exchange index (Bahrain index) Change in Bahrain central Bank key policy rate **Dubai** Implied volatility index (USDAED Implied Volatility) (IVOL) Change in 3-month interbank rate Change in budget balance to GDP (BUDGET/GDP) Spread of UAE CDS (CDS) Rate of UAE interest rate swap Market equity return: Dubai financial market general index (DFMGI Index) Change in crude oil price (OIL) Return of Dubai banks Index Return of Dubai real estate Index **Indonesia** Implied volatility index: JCI Index Historical Volatility (IVOL) Change in 3-month interbank rate: bank Indonesia Jakarta interbank offering rate 3-month Spread of Indonesia CDS (CDS) Market equity return: Jakarta Composite Index (JCI Index) Change in Indonesia budget balance as percentage of GDP (BUDGET/GDP) Financial sector return: MSCI Indonesia/Financials Index free-float weighted equity index ***Continued***

Table 3 Selection of macro-level variables (M_{t-1}) (Continued)

Jordan
Implied volatility index (ASE Index Vol) (IVOL)
Change in 3-month interbank rate: Jordan central bank interbank rate
Market equity return: Amman stock exchange general index (ASE index)
Change in monthly treasury bill rate
Malaysia
Implied volatility index: FBMKLCI Index Vol (IVOL)
Change in 3-month interbank rate
Spread of Malaysia CDS (CDS)
Change in bank Negara Malaysia LIBOR rate (Klibor)
Market equity return: FTSE Bursa Malaysia Kuala Lumpur composite index (Malaysia index)
Change in Malaysia budget balance as percentage of GDP (BUDGET/GDP)
Oil sector return: FTSE bursa Malaysia palm oil plantation (Palm oil index)
Oman
Implied volatility index: MSM30 Index Historical Volatility (IVOL)
Change in repo rate (REPO)
Market equity return: Muscat Securities MSM 30 Index
Change in crude oil price (OIL)
Pakistan
Implied volatility index: KSE Index Historical Volatility (IVOL)
Change in Pakistan main policy rate (indicates the macroeconomic stability of the country)
Market equity return: Pakistan Karachi all share index (KSE Index)
Change in 6-month treasury bill rate
Change in Pakistan 10-year government bond
Log of Pakistan international reserves (RESV)
Saudi Arabia
Implied volatility index (SASEIDX Index Historical Volatility) (IVOL)
Change in 3-month interbank rate index (SAIB3M Index)
Spread of Saudi Arabia CDS (CDS)
Market equity return: Tadawul all share (SASEIDX Index)
Rate of vanilla interest rate swap (SRSWC)
Change in Saudi Arabia debt as percentage of GDP (DEBT/GDP)
Change in Saudi Arabia budget balance as percentage of GDP (BUDGET/GDP)
Change in crude oil price (OIL)
Real estate sector return: Tadawul all Share real estate development industries index (RE)
Energy and utilities sector return: Tadawul all share energy and utilities industries index (EU)
Turkey
Implied volatility index (XU100 Index Historical Volatility) (IVOL)
Change in 3-month interbank rate index: Bank association of Turkey 3-month rates (TRLIBOR)
Spread of Turkey CDS (CDS) (CDS)
Market equity return: Borsa Istanbul 100 Index (XU100 Index)
Change in Turkey debt as a Percentage of GDP (DEBT/GDP)
Change in Turkey budget balance as percentage of GDP(BUDGET/GDP)
Real estate sector return: Borsa Istanbul REITS Sector Index (RE)
Banking sector return: Borsa Istanbul banks Sector Index (Banks Sector)

To estimate the possibility of specific institution to become financially distressed, I use the suggested institution-specific characteristics C_{t-1}^{A} by Adrian and Brunnermeier (2011). I explain the selected proxies and their abbreviations in Table 4 below:

Table 4 Institution-specific characteristics

Proxy	**Calculation**	**Measurement**
SIZE	The logarithm of total market valued total assets	Market capitalisation
LEV	The book value of total assets divided by the book value of total equity	Leverage
MM	Short-term debts net of cash dividends divided by total liabilities	Maturity mismatch
DE	Total debts divided by total capital	Debt to equity
PBV	The market value per share divided by the book value per share	Price to book ratio
SYS	The return of the stock exchange index	System return

Since the above balance sheet data is available on DataStream on a quarterly basis only, I interpolate the quarterly data to weekly data to be able to detect the changes in the institution-specific characteristics in a smoother way. After applying my selection criteria, I focus on 352 institutions from the beginning of 2010 to the end of 2015. The data sample consists of 312 weekly observations for each institution-specific characteristic and macro-level variable. Table 2 (p. 206) shows the financial institutions' names and abbreviations used in this study. Before the analysis, I apply Engle and Granger (1987) two-step procedure to determine whether the variables I include in my model specification are stationary and their inferences are valid. Evidence shows that the included variables are stationary and provide joint explanation of the model.

4.4 Methodology

The first objective of this research comprises building the tail risk network and determining the network effects of Islamic banks. Following Hautsch et al. (2015), the tail risk of an institution "A" with a return X_t^A at time t is measured by its conditional Value-at-Risk ($VaR_{q,t}^A$) CoVaR and is different from the commonly used VaR, since the latter is determined by a large set of relevant independent variables called "tail risk drivers" (W_t).

It is expressed as:

$$\Pr\left(-X_t^A \geq VaR_{q,t}^A \middle| W_t^{(A)}\right) = \Pr\left(X_t^A \geq Q_{q,t}^A \middle| W_t^{(A)}\right) = q, \quad (1)$$

with $VaR_{q,t}^A = VaR_{q,t}^A\left(W_t^{(A)}\right) = -Q_{q,t}^A$ which represents the (negative) conditional q-quantile of X_t^A. The negative quantile ensures that the VaR is positive and infers a loss position. The relevant A-specific tail risk drivers $W_t^{(A)}$ include the lagged macro-level variables M_{t-1}, institutions' specific characteristics C_{t-1}^A, institutions' lagged return X_{t-1}^A and effects of institutions other than A, $E_t^{-A} = (E_t^B)_{B \neq A}$. These effects are called "Loss Exceedances" and defined for institution B as $E_t^B = X_t^B 1(X_t^B \leq Q_{0.1}^B)$, where $Q_{0.1}^B$ is the unconditional 10% sample quantile of X^B. Hence, institution B affects only the VaR of institution A if the former is in distress. [23] The network interdependencies are captured and built based on the loss exceedances.

Based on these specifications, Hautsch, et al. (2014) model the conditional VaR for firm A at time *t* as a linear function $W_t^{(A)}$;$VaR_q^A = W^{(A)`}\xi_q^A$ which can be modelled by return quantile:

$$X_t^A = -W_t^{(A)`}\xi_q^A + \varepsilon_t^A, \tag{2}$$

with $Q_q\left(\varepsilon_t^A \middle| W_t^{(A)}\right) = 0$. I follow Koenker and Bassett, (1978) and estimate the model using the standard linear quantile regression. However, this step is not viable until I determine the relevant tail risk drivers for institution A. The determination of the relevant $W_t^{(A)}$ is not straightforward, because of the large number of regressors in my sample. I cannot use neither individual significance tests because they do not account for possible collinearity between variables nor a sequence of joint significance tests which will have too many variations. Thus, I follow the two-step procedure suggested by Hautsch et al. (2015); i) selection of significant tail risk drivers for institution A using a selection operator and ii) estimation of the 5% conditional VaR of firm A, given the selected significant drivers.

[23] According to Adrian and Brunnermeier (2011), when institution B's negative return exceeds its standard VaR level, it is considered financially distressed and it influences institution A.

4.4.1 Selection of Significant Tail Risk Drivers

I use LASSO (least absolute shrinkage selection operator) which is a useful technique in high-dimensional conditional mean regressions (Tibshirani, 1996). It identifies the significant variables in a data driven way and was recently adapted to quantile regression by Belloni and Chernozhukov (2011). It includes a penalty parameter λ^A, which controls the variables that I should select. The larger the parameter the more variables will be penalised. I calculate the absolute value of the relevant independent variables $\hat{\xi}_q^A$ as follows:

$$\hat{\xi}_q^A = argmin_{\xi^A} \frac{1}{T}\sum_{t=1}^{T} \rho_q(X_t^A + W_t^A \xi^A) + \lambda^A \frac{\sqrt{q(1-q)}}{T} \sum_{k=1}^{K} \hat{\sigma}_k \left|\xi_k^A\right| \tag{3}$$

where $W_t = (W_{t,k})_{k=1}^{K}$ is the relevant set of possible regressors for institution A, which are minimised by $\hat{\sigma}_k = \frac{1}{T}\sum_{t=1}^{T}(W_{t,k})^2$, and ρ_q is the loss function calculated as $\rho_q = u(q - I(u < 0)$ where $I(\cdot)$ is 1 for $u < 0$ and zero otherwise. I eliminate any regressors in the penalised regression whose absolute values of their estimated marginal effects are close to zero. However, the selection of the relevant regressors is depending on the appropriate value of the institution-specific penalty parameter λ^A. I follow the technique suggested by Hastie and Qian (2014). I use an algorithm, which estimates a sequence of models with the objective of minimizing λ^A, and selects the cross-validated model fit. Therefore, the relevant regressors are determined based on the data and without any restrictive pre-assumptions.

After, I run the penalised quantile regression to estimate the 5% quantile for all individual institutions. A conditional VaR specification is expressed below:

$$\widehat{VaR}_{q,t}^{A} = W_t^{(A)\prime} \hat{\xi}_q^{A}. \tag{4}$$

This post-LASSO quantile regression helps us avoid the over-identification problems, especially in case of having a large number of regressors (Belloni and Chernozhukov, 2011). Statistical significance of relevant regressors in the post-LASSO quantile regression are tested against 10% significance level, i.e. any estimate with a p-value less than 0.1 shall be deemed statistically significant.

4.4.2 Goodness of Fit of VaR specifications

I test the predictability of VaR models using the dynamic version of likelihood ratio (LR) developed by Engle and Manganelli (2004). The key idea in this test is checking whether a VaR specification provides the appropriate empirical evidence of VaR exceptions, and checking whether the distribution of exceptions is independent and identically distributed. By doing so, I ensure that VaR exceptions at time t do not contain information about VaR exceptions at time $t+1$ and that both exceptions have the same distribution. According to Berkowitz et al. (2011), LR is more advantageous than the conventional R^2 statistic and plain unconditional level tests such as mean squared error such as those by Kupiec, (1995). This is due to the superior properties of LR in capturing the model's capability to predict the size and frequency of losses.

4.4.3 Network Construction of Institutions' Loss Exceedances

In addition to detecting the significant risk drivers for each individual institution, I construct a financial network in each country, given the significant loss exceedances, which result from the post-LASSO VaR quantile regression. The network shows the strength and direction of connections between financial institutions. If institution A's loss exceedance E_t^A coefficient is relevant and a significant risk driver of institution B's financial distress E_t^B, this influence represents a network arrow from institution A and B. If the loss exceedance of institution A E_t^A is not selected as a relevant risk driver of institution B, there is no network arrow between the two institutions.

I include institution-specific and macroeconomic variables in my model specification. By doing this, I rule out any possibility that linkages are driven by overall increasing volatility levels or sudden drop in a country's credit rating. Accordingly, tail-risk spillovers are likely to be explained by remaining factors such as Islamic banks' own risks and business model commonalities.

My resulting networks show three types of institutions: risk drivers, risk takers and risk distributors. Risk drivers have few incoming network arrows but many outgoing ones. This indicates that the financial distress of these institutions may affect many others and widespread to the system, so the country's central bank and financial authority should closely monitor them. The risk takers appear in the network with many incoming network arrows and few outgoing ones. These institutions are not necessarily systemically risky but they may be financially distressed due to the spillover effects of their own specific characteristics. The risk distributors are these institutions, which act as a risk channel in the system and magnify the effect of institutions' financial distress by transmitting it to new networks. Again, the country's authorities should monitor these institutions because of their key role in increasing systemic risk.

4.4.4 Quantification of Systemic Risk Contributions

After identifying the significant tail-risk networks, I test whether each institution's financial distress significantly contributes to systemic. Below, I introduce the concept of realised systemic risk beta and the procedure for its estimation.

a) Systemic Risk Beta

Systems' tail risk conditional Value-at risk (CoVaR) is measured in the same way an institution's tail risk measurement. I measure system tail-risk $\mathrm{CoVaR}^{s}_{p,t}$ as the $\mathrm{VaR}^{s}_{p,t}$ of X^{s}_{t} conditional on $\mathrm{VaR}^{A}_{q,t}$ and other firm-specific control variables. More particularly, systemic risk beta is derived by an institution A's *q*-th quantile, given the significant networks of loss exceedances, institution specific characteristics and macro-level variables. Marginal systemic risk is expressed as follows:

$$\beta^{s|A}_{p,q} = \frac{\partial VaR^{s}_{p,t}\,(V^{(a)}_{t}, VaR^{A}_{q,t})}{\partial VaR^{A}_{q,t}}, \tag{5}$$

where the marginal systemic risk contribution is the systemic risk beta (*p*-th quantile of the system) and $V^{(A)}_{t}$ are institution-relevant risk drivers.

b) Realised Systemic Risk Contribution

According to Hautsch et al. (2015), realised systemic risk is the total effect of an institution's financial distress (loss exceedance) on the system. It is measured by the realised systemic risk beta and the systemic relevance of institution A as determined based on the statistical significance of $\beta^{s|A}_{p,q}$.

$$VaR_{q,t}^{s} = \beta_{p,q}^{s|A} VaR_{q,t}^{A}. \tag{6}$$

I capture the partial effect of an increase in $VaR_{q,t}^{A}$ on $VaR_{q,t}^{s}$ by $\beta_{p,q}^{s|A}$ and compare the systemic relevance of financial institutions in each country.

It is important here, therefore, to make sure that my estimates are not biased because of the multi-dimensionality of my analytical procedure and limited data. Thus, for each institution I estimate an individual quantile regression of $VaR_{q,t}^{s}$ as expressed below:

$$VaR_{p,t}^{s} = V_t^{(A)'} \gamma_p^{s} + \beta_{p,q}^{s|A}\, VaR_{q,t}^{A}, \tag{7}$$

where $V_t^{(A)'} = (1, M_{t-1}', VaR_{q,t}^{(-A)})'$is the vector of institution A's relevant risk drivers (selected post-LASSO in section (4.1)), which contain a constant term, lagged macro-level variables, lagged institution-specific characteristics and relevant loss exceedances of other institutions. It is unfeasible to run the full model with all institutions however, because this will produce unreliable results due to the correlation effects between my many variables.

c) Systemic Relevance and Time Variability

Financial institutions' importance to the system may change over time, given their tendency to experience financial distress during periods of turbulence. Accordingly, I identify each institutions' relevance to the system to account for time variability in its systemic contribution. This step is important for the regulatory authorities, because it allows them to monitor and supervise the financial system and capture any signs for possible instabilities. Therefore, I account for the marginal change in institution A's vance $\beta_{p,q}^{s|A}$ to the system.

1) For each institution, I use a wild bootstrap procedure following Chen et al. (2008) to generate estimated $\widehat{VaR}_t^A$, given the quantile specification.
2) For each institution, I estimate the realised systemic risk beta using quantile regression at 5%, where systems' VaR is dependent on an institution's-specific characteristics, macro-level variables, loss exceedances of other institutions, and $\widehat{VaR}_t^A$.
3) The full marginal effect of VaR for institution A on system's VaR is expressed as follows:

$$\beta_{p,q,t}^{s|A} = \beta_{0,p,q}^{s|A} + Z_{t-1}^{A}{}' \, \eta_{p,q}^{s|A}, \tag{8}$$

where the lagged form of Z^A helps in predicting systemic beta and maintains stability in the estimates, and $\eta_{p,q}^{s|A}$ are its relevant coefficient.

4) I check whether the systemic risk beta $\beta_{p,q}^{s|A}$ is significant. I consider an institution whether it is systemically relevant; if an increase in its loss position, given its relevant risk drivers, leads to a higher potential systemic loss. This requires that the systemic risk beta $\beta_{p,q}^{s|A}$ is significant and nonnegative. I use Hautsch et al. (2015) linear model in lagged observable factors Z_{t-1}^A, based on which institution A's

tendency to become financially distressed is determined. I test whether the realised systemic risk beta $\beta_{p,q,t}^{s|A}$ is significance, given all relevant and potential risk drivers (selected by LASSO) for institution "A". I test the hypothesis:

$$H1\colon\ \beta_0^{s|A} = \eta_{MM}^{s|A} = \eta_{SIZE}^{s|A} = \eta_{LEV}^{s|A} = \eta_{PBV}^{s|A} = \eta_{DE}^{s|A} = 0.$$

5) If the previous model has significant F-statistic, I test for time-variability by running a linear regression model using all institution-specific variables (only) as potential drivers of time-variation in systemic risk betas. This to determine whether realised systemic risk beta is driven by institutions' balance sheet structures. I test for this joint hypothesis:

$$H2\colon \eta_{MM}^{s|A} = \eta_{SIZE}^{s|A} = \eta_{LEV}^{s|A} = \eta_{PBV}^{s|A} = \eta_{DE}^{s|A} = 0.$$

6) If I do not reject H2, I re-specify the model and re-estimate a quantile regression model with $\widehat{VaR}_{q,t}^{A}$ only and specify the systemic risk beta as a constant ($\beta^{s|A} = \beta_t^{s|A}$). I test the hypothesis: $H3\colon\ \beta^{s|A} = 0$.

Overall, the results from the joint hypothesis tests H1, H2 and H3 should indicate the following; any F-statistic with p-value less than 10% is considered statistically significant. Under H1, if the p-value of the F-statistic is significant, this means that relevant macroeconomic variables, institution-specific characteristics, other financial institutions' loss exceedances and the VaR of the institution itself all together affect its relevance to the system. After, I test H2 to determine whether the relevance of financial institutions is driven solely by its specific characteristics. If the p-value of the F-statistic is significant, this indicates that there is a time variability in the effect of an institution on the financial system. If p-value of the F-statistic is not significant under H1 and H2, I test for H3 to determine whether an institution's relevance is dependent on its financial distress solely. If p-value is significant, this indicates that the institution is systemically relevant because of its financial distress and it contributes to systemic risk. If none of the models are significant, the institution is considered to be not systemically relevant.

4.5 Empirical Results

In this section, I demonstrate the findings regarding: i) the role of the relevant risk factors in driving an institution to become financially distressed, ii) the financial network spillovers and the role of institutions in driving or transmitting the trail-risk in the system and iii) testing the significance and time variability of systemic risk contributions.

4.5.1 Post-LASSO Quantile Regression Results

I use the LASSO procedure described in section 4.4.1 to find the relevant tail-risk drivers. I find that macro-level variables and institution-specific characteristics are not selected by LASSO procedure and loss exceedances (financial linkages) of other financial institutions and are more prevalent. Given post-LASSO results, I test whether financial linkages, institution-specific or macro-level variables are more statistically relevant to each institution's financial distress (CoVaR). For robustness, I: i) estimate based on quantile = 5% the CoVaR of each institution, given all risk drivers selected by LASSO and ii) estimate CoVaR, given only institution-specific characteristics and macro-level variables. Table 5 (p. 178) shows examples of the results from post-LASSO quantile regressions. All results are in appendix A.

Table 5 Exemplary Post-LASSO Quantile Regression: VaR 5%

This table shows each institution's estimated VaR, given the relevant risk drivers selected by LASSO
I only include the quantile regression outputs which show at least one significant risk driver.

Abu Dhabi

	Value	Std. Error	*t*-ratio	*P*-value
A6_OBF				
(Intercept)	-4.55187	1.51605	-3.00245	0.0029
A6_OBF_log	-0.33467	0.15351	-2.18009	0.03001
A14_FHP_LE	-1.09522	0.55036	-1.99	0.04747
A29_RASK_LE	2.15314	4.00012	0.53827	0.59078
A7_OBR				
(Intercept)	-1.11576	0.22136	-5.04048	0
A7_OBR_log	-0.26484	0.08314	-3.18559	0.0016
ADSMI_Index	0.08335	0.07214	1.15542	0.24883
A1_ADC_LE	0.14562	0.12886	1.13007	0.25934
A2_ADI_LE	-0.8695	0.24107	-3.60687	0.00036
A3_BOS_LE	-0.51834	0.19363	-2.67701	0.00783
A4_CBI_LE	-0.73731	0.30874	-2.38814	0.01755
A8_SI_LE	-0.48796	0.17078	-2.8572	0.00457
A9_UOB_LE	0.08474	0.12638	0.67055	0.50302
A30_MT_LE	0.21517	0.10841	1.98477	0.04807
A7_OBR				
(Intercept)	-1.32822	0.25238	-5.26272	0
A5_OB_LE	-0.02585	0.16856	-0.15334	0.87823
A7_OBR_LE	-0.47906	0.10283	-4.65852	0
A9_UOB_LE	-0.38806	0.50923	-0.76206	0.44661
A30_MT_LE	-0.19499	0.05959	-3.27226	0.00119
A9_UOB				
(Intercept)	-1.68977	0.34265	-4.93148	0
A9_UOB_log	-0.30169	0.08857	-3.4062	0.00075
oil	0.07249	0.03759	1.92867	0.05472
ADSMI_Index	0.02391	0.08687	0.27527	0.7833
A1_ADC_LE	-0.54673	0.18259	-2.99434	0.00298
A2_ADI_LE	-0.10237	0.17931	-0.57088	0.56851
A3_BOS_LE	0.0635	0.11468	0.55375	0.58017
A5_OB_LE	0.02147	0.15448	0.13901	0.88953
A8_SI_LE	-0.6907	0.18443	-3.74509	0.00022
A13_IBP_LE	-0.24844	0.17076	-1.45491	0.14675
A14_FHP_LE	0.0644	0.09806	0.6568	0.51181
A17_AAA_LE	0.39071	0.12611	3.09811	0.00213
A30_MT_LE	-0.01297	0.05644	-0.22987	0.81835
A31_INSUH_LE	0.41261	0.15431	2.67391	0.00791

Dubai

	Value	Std. Error	*t*-ratio	*p*-value
D11_DF				
(Intercept)	-430.903	175.1578	-2.46008	0.01446
D11_size	73.53414	30.06555	2.44579	0.01503
D11_LEV	-73.2028	34.49173	-2.12233	0.03463
D11_DF_log	-0.18357	0.07889	-2.32703	0.02063
DFMGI_Index	0.09894	0.04946	2.00061	0.04634
D1_DIB_LE	-0.54297	0.33412	-1.62509	0.1052
D6_AJ_LE	-0.12839	0.24646	-0.52093	0.6028
D8_DI_LE	-0.66491	0.23878	-2.78465	0.0057
D9_SHC_LE	-0.13916	0.16404	-0.84833	0.39694
D12_GGI_LE	-0.24422	0.13494	-1.80986	0.07133
D14_IAI_LE	-0.28998	0.10493	-2.76359	0.00607
D20_ALEABS_LE	0.31709	1.67764	0.18901	0.85022
D23_OI_LE	-14134.8	17741.52	-0.79671	0.42626
D25_DALE_LE	-0.10335	0.09885	-1.04549	0.29665

Pakistan

	Value	Std. Error	*t*-ratio	*p*-value
P8_UB				
(Intercept)	15.69103	7.87579	1.99231	0.04726
P8_UB_PBV	-2.18695	1.12211	-1.94897	0.05224
P8_UB_DE	1.29208	1.60101	0.80704	0.42029
P8_UB_log	-0.02666	0.09497	-0.28072	0.77912
PK_INT_RESV	-3.49941	1.91047	-1.83169	0.068
P1_COM_LE	-0.39952	0.22047	-1.81213	0.07098
P3_SB_LE	0.12265	0.16134	0.76019	0.44775
P4_HMB_LE	-0.37585	0.21511	-1.74725	0.08163
P5_OBP_LE	-0.27013	0.11751	-2.29876	0.02222
P7_BAL_LE	0.01107	0.21705	0.05101	0.95935
P9_ALB_LE	-0.04486	0.35533	-0.12624	0.89963
P10_BOP_LE	-0.16798	0.21646	-0.77602	0.43836
P13_MCB_LE	-0.22209	0.48251	-0.46027	0.64566
P14_NIB_LE	-0.16993	0.14167	-1.1995	0.23129
P17_HB_LE	-0.74311	0.42628	-1.74324	0.08233

continued

						Bahrain				
	Value	Std.Error	*t*-ratio	*p*-value			Value	Std. Error	t-ratio	p-value
Malaysia		(Intercept)	1.76342	1.65899	1.06295	**B1_AUB**				
M5_AMM										0.28866
(Intercept)	-0.70559	0.16944	-4.16422	0.00004		B1_AUB_PBV	-0.80484	0.51121	-1.57437	0.11646
M5_AMM_log	0.07549	0.05978	1.26279	0.20766		B1_AUB_log	0.24369	0.13908	1.75211	0.08078
Budget_Balance_GDP	-0.51795	0.82973	-0.62424	0.53295		BHSEASI	0.47634	0.18514	2.57285	0.01057
FTFBMPM	0.13783	0.04133	3.33475	0.00096		IMP_VOL	-0.06868	0.16181	-0.42443	0.67156
M3_BIMB_LE	0.20729	0.06585	3.14801	0.00181		B3_BIB_LE	0.14494	0.39679	0.36528	0.71516
M4_HLF_LE	-0.52009	0.13951	-3.72795	0.00023		B6_TBB_LE	0.13308	0.18947	0.70236	0.483
M6_CIM_LE	-0.28436	0.13707	-2.07465	0.03888		B9_IB_LE	-0.0117	0.43772	-0.02673	0.97869
M7_MAL_LE	-0.33829	0.21956	-1.54076	0.12444		B10_ALB_LE	0.025	0.08167	0.30614	0.75971
M8_PUB_LE	0.13212	0.23698	0.5575	0.5776		B14_EI_LE	-253.984	221.9872	-1.14414	0.25348
M9_RHB_LE	-0.60859	0.07172	-8.48615	0		B15_SAI_LE	1.09077	3.42192	0.31876	0.75013
M10_ALL_LE	-0.03241	0.15642	-0.2072	0.836		B20_BK_LE	-0.16979	0.73827	-0.22999	0.81826
M13_BUR_LE	-0.11684	0.12072	-0.96782	0.33392		**B2_AB**				
M20_MB_LE	-0.01089	0.06749	-0.16132	0.87195		(Intercept)	-2.59366	0.42971	-6.03578	0
M22_HWA_LE	0.15183	0.13231	1.14749	0.25211		BHSEASI	0.93823	0.22288	4.20967	0.00003
M31_TIH_LE	-0.20113	0.11427	-1.76016	0.07941		B4_BBK				
/M9_RHB						(Intercept)	3.23466	1.87606	1.72418	0.08568
(Intercept)	-0.52149	0.1311	-3.97765	0.00009		B4_BBK_PBV	-3.30088	1.42567	-2.31531	0.02125
FTFBMPM	0.07813	0.05457	1.43173	0.15326		BHSEASI	0.18389	0.15824	1.16213	0.24609
M4_HLF_LE	0.01843	0.13414	0.13739	0.89081		B8_ASB_LE	-0.18616	0.10776	-1.7276	0.08507
M5_AMM_LE	-0.14473	0.08035	-1.80119	0.07267		B5_GFH				
M6_CIM_LE	-0.28017	0.31459	-0.89059	0.37386		(Intercept)	-3.31829	1.61871	-2.04996	0.04122
M7_MAL_LE	0.03836	0.26127	0.14681	0.88338		B5_PBV	-0.15738	0.36551	-0.43057	0.66709
M10_ALL_LE	-0.3358	0.13332	-2.51883	0.01229		BHSEASI	1.39202	0.60063	2.31761	0.02113
M11_RCE_LE	-0.01325	0.19262	-0.0688	0.94519		B2_ABC_LE	-2.08991	2.4329	-0.85902	0.391
M29_AM_LE	0.15589	0.12672	1.23023	0.21957		B9_IB_LE	-4.44161	3.04634	-1.45802	0.14586
M19_ACS						**B7_UGB**				
(Intercept)	7.66805	3.40791	2.25008	0.02518		(Intercept)	2.33709	13.48271	0.17334	0.8625
M19_ACS_DE	-9.67899	3.61611	-2.67663	0.00785		B7_LEV	0.08696	0.60332	0.14414	0.88549
M19_ACS_MM	8.45989	4.66721	1.81262	0.07091		B7_DE	-0.02543	0.2402	-0.10588	0.91575
M19_ACS_log	0.07144	0.0744	0.96026	0.33771		B7_MM	-0.65939	3.85581	-0.17101	0.86433
Budget_Balance_GDP	3.50283	2.48042	1.41219	0.15895		B7_PBV	-1.3305	2.56539	-0.51864	0.6044
FTFBMPM	0.09459	0.12834	0.73703	0.46169		B7_UGB_log	0.0877	0.26122	0.33575	0.7373
M6_CIM_LE	-0.02643	0.32948	-0.08023	0.93611		BHSEASI	0.16291	0.24698	0.65961	0.51002
M9_RHB_LE	-0.06185	0.31684	-0.1952	0.84537		B2_ABC_LE	0.02806	0.35264	0.07958	0.93662
M14_APEX_LE	0.20382	0.14949	1.36344	0.17378		B4_BBK_LE	-0.25754	0.39829	-0.64662	0.51838
M17_JH_LE	-0.08193	0.08913	-0.91925	0.35871		B8_ASB_LE	-0.4735	0.34853	-1.35857	0.17532
M18_KUD_LE	-0.19576	0.23704	-0.82586	0.40955		B11_KHC_LE	0.04299	0.42114	0.10208	0.91877
M26_MAA_LE	-0.11327	0.19674	-0.57574	0.56523		B14_EI_LE	-444.045	391.1136	-1.13534	0.25716
M27_PAC_LE	-0.43086	0.18535	-2.32454	0.02078		B17_INVB_LE	-1.84442	0.80589	-2.28868	0.0228
M30_MHB_LE	-0.49382	0.2367	-2.08628	0.03781		B19_AHLINS_LE	-0.05374	0.67327	-0.07981	0.93644

Generally, my results show that loss exceedances of other financial institutions are statistically significant in most countries, and are more dominant as drivers of institutions' CoVaRs. For example, CoVaR estimation outputs for institutions such as Bank Albilad (S1_ALB), Bupa Arabia for Cooperation (S22_BUP), Saudi Reinsurance (S40_SREIN)) in Saudi Arabia and Bank QNB Indonesia (I6_BQI) and TP bank Bukopin PIN TBK (I12_BUKO) and Bank International Indonesia (I15_BII) in Indonesia, contain only loss exceedances of other institutions.

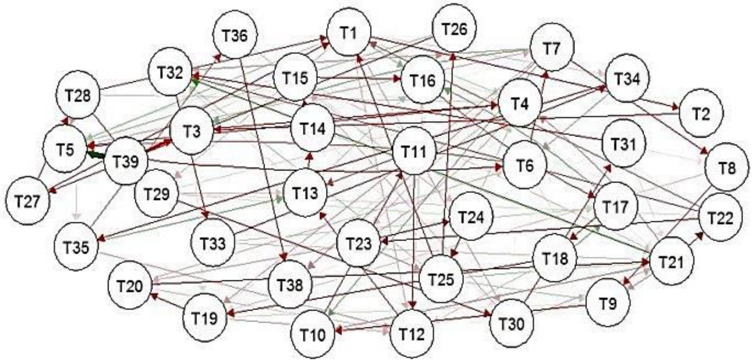
On the other hand, Turkey's general macroeconomic state variables such as stock market index, implied volatility, TLIBOR and real estate sector have shown a significant impact on CoVaR compared to other countries. While institution-specific characteristics appear to affect Bahraini institutions' CoVaR as much as other institutions' loss exceedances do. I also find that there are some institution-specific variables more prevalent than the others are. Lagged-return (log) is significant as a risk driver of a considerable number of institutions' VaRs in Turkey, Indonesia, Dubai and Oman, whereas price-to-book ratio (PBV) is more prevalent and significant in Turkey, Indonesia, Bahrain, Oman, and Jordan. For macro-level variables, there is a general absence of indices for the countries' main industries. Crude Oil (Saudi Arabia, Abu Dhabi, Dubai, Oman), palm oil (Malaysia), energy and utilities (Saudi Arabia) are not widely selected by LASSO, and when selected they are mainly insignificant and do not affect institutions' VaRs.

When it comes to the risk drivers of Islamic institutions CoVaRs, I find that loss exceedances are the main drivers in most countries, except in Bahrain and Dubai. Table 6 (p. 181) shows details about the significant risk drivers for Islamic Institutions.

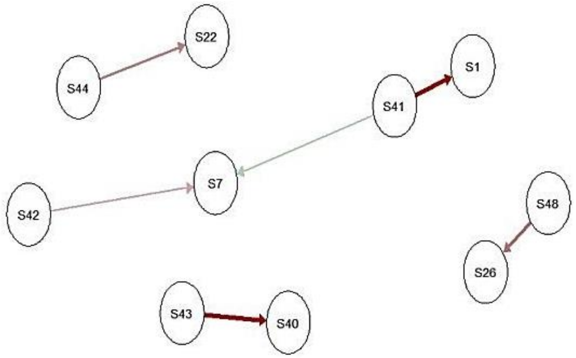
<table>
<tr><th colspan="3">Table 6 Significant Risk drivers of Islamic Institutions’ CoVaR</th></tr>
<tr><td>Abu Dhabi</td><td colspan="2">Mainly loss exceedances (only one Islamic bank’s CoVaR is affected by PBV)</td></tr>
<tr><td>Indonesia</td><td colspan="2">Mainly loss exceedances, few Islamic institutions are affected by (log), PBV, and IVOL.</td></tr>
<tr><td>Malaysia</td><td colspan="2">Only loss exceedances</td></tr>
<tr><td>Bahrain</td><td colspan="2">ARAB BANKING CORPORATION, GULF FINANCE HOUSE, ITHMAAR BANK BSC,

KHALEEJI COMMERCIAL BANK are mainly affected by stock market index</td></tr>
<tr><td>Pakistan</td><td colspan="2">Mainly loss exceedances</td></tr>
<tr><td>Oman</td><td colspan="2">Mainly loss exceedances and lagged return</td></tr>
<tr><td rowspan="2">Jordan</td><td>JORDAN DUBAI ISLAMIC BK</td><td>PBV, LEV, DE, MM, IVOL, Inter-bank rate, four loss exceedances of other institutions</td></tr>
<tr><td>JORDAN ISLAMIC BANK</td><td>PBV and four loss exceedances</td></tr>
<tr><td rowspan="3">Dubai</td><td>DUBAI ISLAMIC BANK</td><td>lagged return, market index, banks sector</td></tr>
<tr><td>AJMAN BANK</td><td>lagged return and loss exceedances</td></tr>
<tr><td>TAKAFUL EMARAT PJSC</td><td>DE, PBV, Budget Balance to GDP and loss exceedances</td></tr>
<tr><td>Turkey</td><td colspan="2">Only loss exceedances</td></tr>
<tr><td>Saudi Arabia</td><td colspan="2">Only loss exceedances</td></tr>
</table>

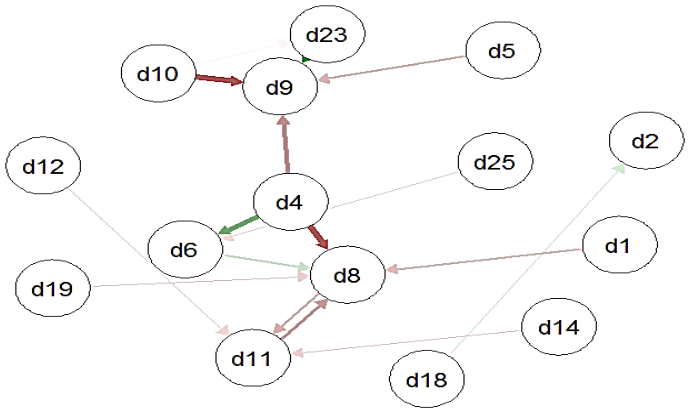
4.5.2 Financial Networks Structure



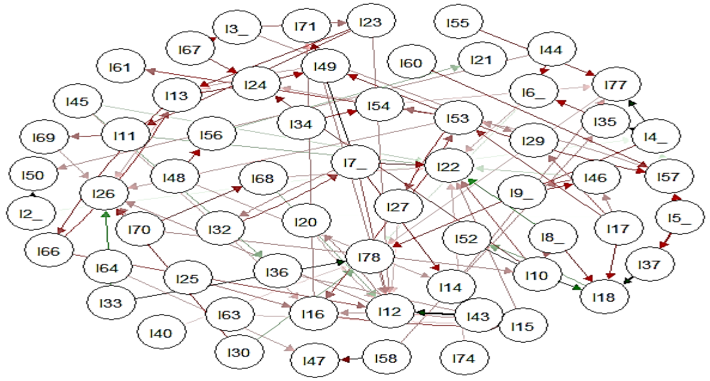
Turkey



Saudi Arabia

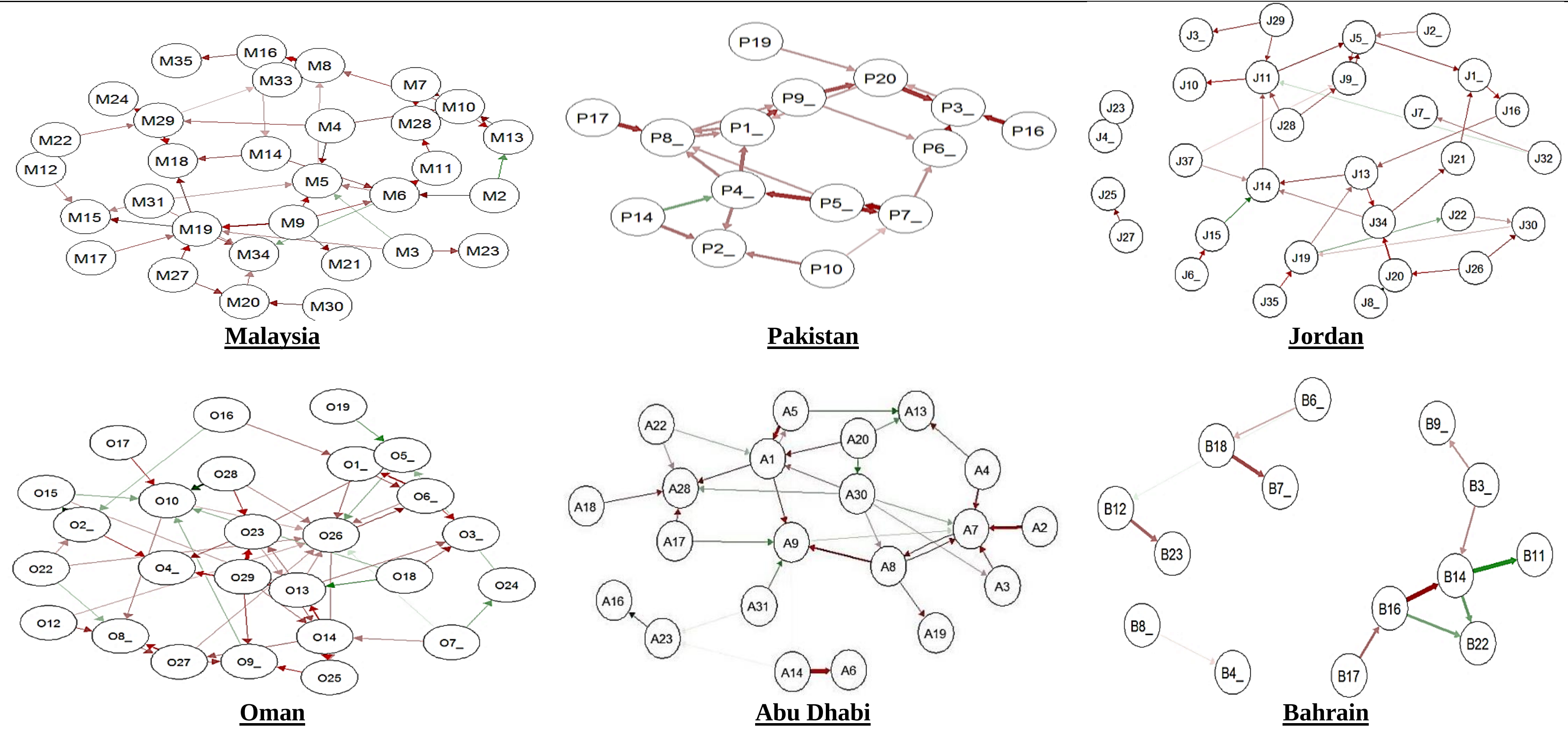


Dubai



Indonesia

Figure 1 Interconnectedness between financial institutions in 10 Countries



Continue Figure 1: Interconnectedness between financial institutions in 10 Countries

This figure shows the network graphs for 10 countries' financial systems. Each circle represents an institution in the financial system and their acronyms are in Table 2 (p. 204). Network linkages (arrows) indicate tail-risk spillover effects, but does not refer to the size of the effect. If an Institution has more outgoing arrows than ingoing arrows, it is considered to be a risk driver in the system. If an institution has more ingoing arrows than outgoing arrows it is considered a risk recipient. If an institution ingoing and outgoing arrows are merely equal, it is considered to be a risk transmitter or a risk channel.

This network topology offers visual illustration for each institution's role in the financial system, given its financial distress level. Again, when institution A exceeds its standard VaR level, I consider it financially distressed, and it starts affecting the other financial institutions. According to the networks above, institution B's loss exceedance is a relevant risk driver for institution A, if the latter affects A's distress and there is a network connection between them. The focus in this research is on the role of Islamic institutions in the financial system. I do not investigate the interconnectedness within sectors, but I focus on how widespread is the interconnectedness of institutions between different sectors (conventional banks, Islamic banks, insurance companies, Islamic insurance companies, brokers, asset managers and investment banks). Generally, the role of Islamic institutions in Table 7 varies across and within countries.

Table 7 Role of Islamic Banks in Systems' Financial Networks

Abu Dhabi	Methaq Takaful (A30) is a risk driver and it affects both Islamic banks and other financial institutions, while Sharjah Islamic bank (A8) is a risk channel
Bahrain	All Islamic banks are risk recipient
Dubai	Dubai Islamic Bank (D1) is risk driver and Ajman Bank (D6) is risk recipient
Indonesia	Bank Mandiri (I7), Bank Rakayat Indonesia (I8) and PT Bank Mega Terbuka (I9) are risk drivers, Bank Central Asia (I10), PT Bank Bumi Arta (I11), Bank Rakayat Industrial (I11), Bank Victoria International (I24), 4 other Islamic windows are risk channels. Only Bank Tabungan Pensiunan Nasional (I22) is risk recipient and out of ten network connections, it is affected by five other Islamic banks.
Jordan	Jordan Dubai Islamic Bank (J14) is risk recipient while Jordan Islamic Bank (J11) is risk channel.
Malaysia	Islamic banks are either channels or drivers
Oman	Al Madina Investment (O12) and Oman United Insurance (O29) are risk drivers and Bank Nazwa (O4) is risk recipient
Pakistan	Only Standard Chartered (P6) is risk driver, Bank Al Habib LTD (P1) as a risk channel and Askari Bank Limited (P2), Mezan Bank LTD (P6) and Bank Alfalah LTD (P7) are risk recipients.
Saudi Arabia	Weqaya Takaful only is a risk driver, while the rest of Islamic institutions are risk recipients
Turkey	Islamic banks are risk recipients

Given the publicly disclosed data, I cannot identify the reasons for linkages between Islamic institutions and other institutions. The reasoning of these linkages would require compilation of comprehensive data sets about credit and liquidity status of the selected institutions. To date, product specific data in Islamic institutions is limited and not accessible.

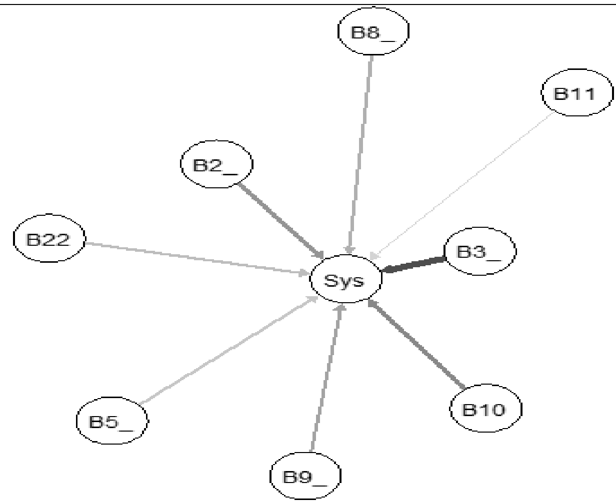
Note also that there are no simultaneity biases i.e. the more the CoVaR of institution A is driven by loss exceedances of B, the more the spillover effects from institution A on B. Simultaneity biases are very weak, because an increase in A's CoVaR may increase the "expected" loss exceedance of B, but not necessarily affect the "realised" loss exceedance. Based on the results outlined in Table 5 (Appendix), supervisory authorities should closely observe and monitor the practices of Islamic institutions, especially in countries where they act as risk drivers or risk channels. This indicates that Islamic banks' financial distress may be magnifying the financial distress in the system and contributing to systemic risk. In addition, if an institution has few network connections, this does not necessarily mean that it will not affect the overall system and be systemically relevant. Accordingly, I determine how relevant each Islamic institution is to the system, regardless of network connections, and show the significance of its systemic contribution, if there is any.

4.5.3 Systemic Risk Relevance (Realised Systemic Risk)

I run joint significance tests by testing for three hypotheses. First, I test H1 in section 4.4.4 (c) to determine whether Islamic institutions are systemically relevant given all relevant risk drivers. If models' F-statistic is significant, I test H2 to find if there is time variability in their systemic risk contribution driven by their institution-specific characteristics. If the model

F-statistic is insignificant, I re-estimate the model and test H3, given only the expected VaR of Islamic institutions, to know whether each institution's distress is significantly affecting the system. If none of the tests' F-Statistic is significant, the institution's effect on the system is deemed insignificant. The results of the joint significance test in Table 8 to Table 17 provide further evidence about the role of financial linkages and institution-specific variables in driving Islamic institutions' financial distress.

Table 8 Bahrain Realised Systemic Risk and Time Variability				
		H1	H2	H3
ARAB BANKING CORPORATION++	B2_ABC	2.20E-16	2.20E-16	
BAHRAIN ISLAMIC BANK ++	B3_BIB	0.09182	0.1224	
GULF FINANCE HOUSE ++	B5_GFH	3.18E-13	2.72E-07	
TAIB BANK BSC ++	B6_TBB	-	-	
AL SALAM BANK ++	B8_ASB	1.67E-13	1.25E-13	
ITHMAAR BANK BSC ++	B9_IB	2.20E-16	2.20E-16	
AL BARAKA BANKING GROUP**	B10_ALB	2.20E-16	8.04E-06	
KHALEEJI COMMERCIAL BANK++	B11_KHC	0.00011	0.0001671	
TAKAFUL INTL.CO. ++	B22_TAKI	0.02336	0.01791	

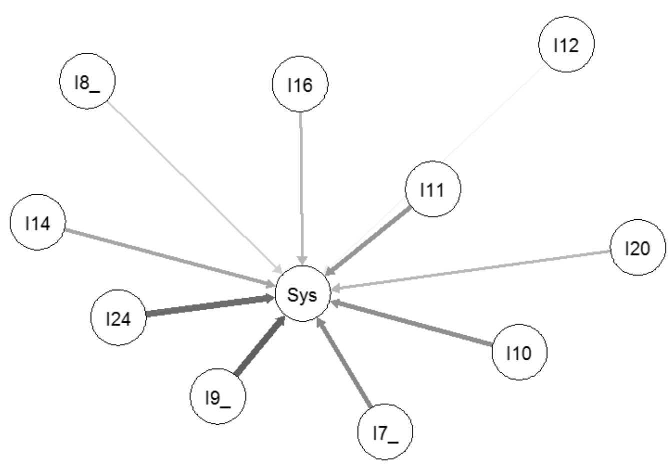


Institution	β_0^s
B2_ABC	1.066
B3_BIB	3.2933
B5_GFH	0.08388
B6_TB	-
B8_ASB	0.0065697
B9_IB	0.372072
B10_ALB	1.92588
B11_KHC	0.06658
B22_TAKI	0.15552

Figure 2 Bahrain: Islamic Institution Systemic risk contribution

My results for Bahrain show that all Islamic Institutions are systemically relevant, and they have time-variability in their effect due to specific characteristics, except for BAHRAIN ISLAMIC BANK. The latter does not change in its effect over time due to its specific-characteristics. These are important results to regulators, since Bahrain is becoming the hub of Islamic finance and banking, where regulators should understand Islamic financial institutions' contributions to the financial system and the reasons behind their relevance. In addition, the results about their relevant realised systemic risk confirm the earlier results I obtained from the post-LASSO procedure and the penalised quantile regressions. As I show in Table 5 (Appendix), many institution-specific characteristics are significant and play an important role in defining Islamic institutions financial distress.

Table 9 Indonesia Realised Systemic Risk and Time Variability				
		H1	H2	H3
BANK MANDIRI ++	I7_BM	0.0001918	4.24E-05	-
BANK RAKYAT INDONESIA++	I8_BRI	0.0004435	0.09432	-
PT BANK MEGA TERBUKA ++	I9_PBM	0.7598	0.1608	0.05693
BANK CENTRAL ASIA ++	I10_BCA	0.02516	0.0928	-
PT BANK BUMI ARTA ++	I11_BUMI	0.06564	0.06564	-
PT BANK BUKOPIN TBK **	I12_BUKO	0.0266	0.007713	-
BANK DANAMON INDONESIA**	I14_DAM	0.0184	0.05462	-
BANK CIMB NIAGA TBK **	I16_BCN	0.09482	0.1781	0.3271
BANK PERMATA TBK **	I17_PER	0.3228	0.3228	0.3228
BANK RAKYAT IND ++	I20_AGR	0.1877	0.05885	-
BANK TABUNGAN PENSIUNAN NASIONAL ++	I22_TAB	0.2622	0.2622	0.2622
BANK VICTORIA INTL. ++	I24_VIC	0.09273	0.09273	-
BANK PANIN DUBAI **	I37_PANI	0.7169	0.7169	0.7169



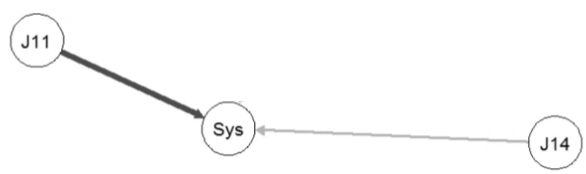
Institution	β_0^s
I7_BM	0.08401
I8_BRI	0.03383
I9_PBM	0.11277
I10_BCA	0.07959
I11_BUMI	0.07506
I12_BUKO	0.01196
I14_DAM	0.00269
I16_BCN	0.05086
I20_AGR	0.05133
I24_VIC	0.1039

Figure 3 Indonesia: Islamic Institution Systemic risk contribution

For Indonesia, it is considered the largest country in terms of Muslim population with the Islamic banking sector representing a large proportion of total market share. My results show that ten out of thirteen Islamic financial institutions are systemically relevant except three institutions (BANK PERMATA TBK, BANK TABUNGAN PENSIUNAN NASIONAL, and BANK PANIN DUBAI), where two institutions are fully fledged Islamic banks and one is a bank with Islamic window. Seven systemically relevant Institutions also showed time variability in their effect on the financial system (BANK MANDIRI, BANK RAKYAT INDONESIA, BANK CENTRAL ASIA, PT BANK BUMI ARTA, PT BANK BUKOPIN TBK, BANK DANAMON INDONESIA, BANK RAKYAT IND and BANK VICTORIA INTL).

Table 10 Jordan Realised Systemic Risk and Time Variability

		H1	H2	H3
JORDAN ISLAMIC BANK ++	J11_JIB	2.54E-08	1.97E-08	-
JORDAN DUBAI ISLAMIC BK.++	J14_JDI	0.02141	0.01802	-
FIRST FINANCE	J35_FF	0.9856	0.9055	0.9055

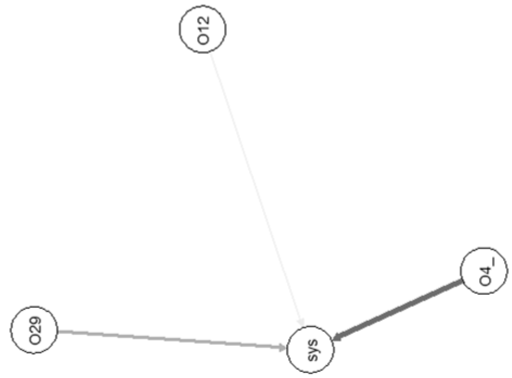


Institution	β_0^s
J11_JIB	0.49505
J14_JDI	0.20973

Figure 4 Jordan: Islamic Institution Systemic risk contribution

Table 11 Oman Realised Systemic Risk and Time Variability

		H1	H2	H3
BANK NIZWA	O4_NIZ	0.9794	0.75	7.50E-02
AL MADINA INVESTMENT	O12_MADI	0.006886	0.07852	
OMAN UNITED INSURANCE	O29_OUI	7.52E-16	2.08E-05	

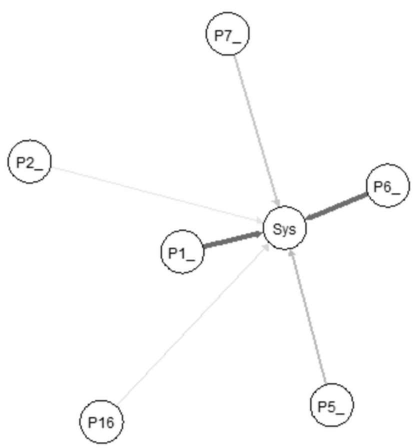


Institution	β_0^s
O4_NIZ	0.883
O12_MADI	0.11111
O29_OUI	0.4724

Figure 5 Oman: Islamic Institution Systemic risk contribution

Table 12 Pakistan Realised Systemic Risk and Time Variability

		H1	H2	H3
BANK AL HABIB LTD	P1_COM	7.68E-03	1.89E-05	
ASKARI BANK LIMITED	P2_AB	0.6521	0.001704	
NATIONAL BK OF PAKISTAN	P5_OBP	2.67E-03	4.25E-01	
MEEZAN BANK LTD.	P6_MBL	0.06523	0.002672	
BANK ALFALAH LTD	P7_BAL	7.70E-02	1.21E-02	
STANDARD CHARTERED	P16_SC	9.12E-01	2.87E-03	



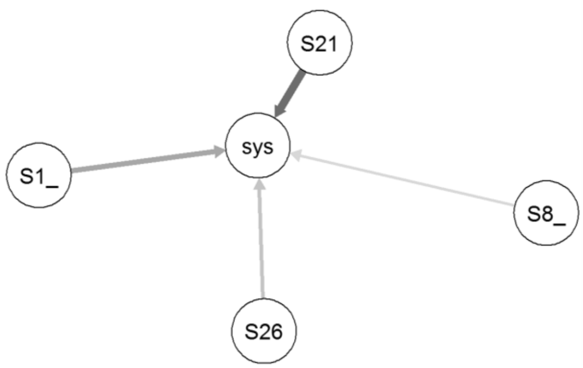
Institution	β_0^s
P1_COM	0.42029
P2_AB	0.07964
P5_OBP	0.19406
P6_MBL	0.4137
P7_BAL	0.15773
P16_SC	0.07496

Figure 6 Pakistan: Islamic Institution Systemic risk contribution

In Pakistan, three Islamic institutions (BANK AL HABIB LTD, MEEZAN BANK LTD, and BANK ALFALAH LTD) are systemically relevant and all have time variability in their effect on the system. While two institutions only are relevant to the system due to their characteristics (ASKARI BANK LIMITED and STANDARD CHARTERED).

Table 13 Saudi Arabia Realised Systemic Risk and Time Variability

		H1	H2	H3
BANK ALBILAD ++	S1_ALB	0.0024	0.000001	
ALINMA BANK ++	S2_ALI	0.4325	0.2145	0.2145
AL RAJHI BANKING ++	S3_RAJ	0.8327	0.1143	0.1193
BANQUE SAUDI FRANSI**	S4_SFAR	0.1342	0.1147	0.11547
BANK ALJAZIRA ++	S6_JAZ	0.1234	0.3214	0.3714
SAMBA FINANCIAL GROUP**	S8_SAMB	0.000012	0.00014	
ALAHLI TAKAFUL COM	S21_TAK	0.0014	0.00075	
SABB TAKAFUL	S26_SABT	0.000031	0.0014	
WEQAYA TAKAFUL IN&R. SUSP	S42_WTI	0.70012	0.7714	0.774812
SOLIDARITY SAUDI TAKAFUL	S50_SOL	0.1124	0.221	0.3141

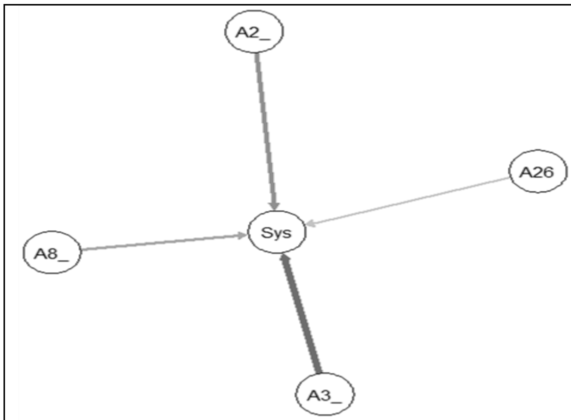


Institution	β_0^s
S1_ALB	0.9
S8_SAMB	0.4
S21_TAK	1.5
S26_SABT	0.6

Figure 7 Saudi Arabia: Islamic Institution Systemic risk contribution

Table 14 Abu Dhabi Realised Systemic Risk and Time Variability

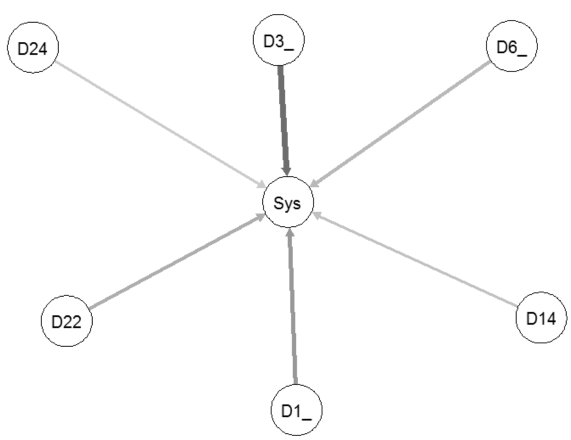
		H1	H2	H3
ABU DHABI ISLAMIC BANK++	A2_ADI	2.20E-16	2.20E-16	
BANK OF SHARJAH ++	A3_BOS	2.20E-16	2.16E-12	
SHARJAH ISLAMIC BANK ++	A8_SI	5.73E-09	1.22E-08	
ABU DHABI NATIONALTAKAFUL++	A26_ADT	3.61E-01	6.69E-02	



Institution	β_0^s
A2_ADI	1.12934
A3_BOS	2.4939
A8_SI	0.70924
A26_ADT	0.10229

Figure 8 Abu Dhabi: Islamic Institution Systemic risk contribution

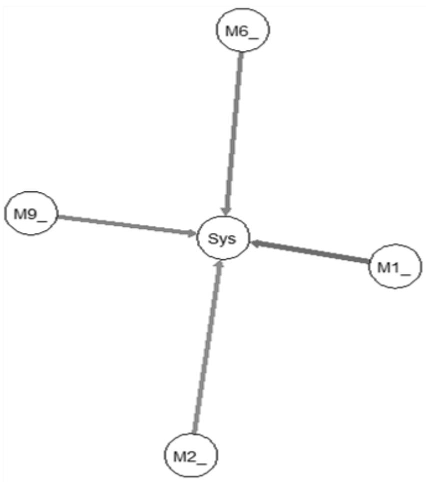
Table 15 Dubai Realised Systemic Risk and Time Variability				
		H1	H2	H3
DUBAI ISLAMIC BANK ++	D1_DIB	2.20E-16	5.10E-16	
EMIRATES ISLAMIC BANK++	D3_EMI	0.003529	0.003249	
AJMAN BANK ++	D6_AJ	0.0176	0.7525	
ISLAMIC ARAB INSURANCE	D14_IAI	0.01089	0.009123	
DUBAI ISLAMIC INSURANCE	D22_DI	1.56E-02	7.20E-02	
TAKAFUL EMARAT PJSC	D24_TE	4.56E-01	7.38E-02	0.03981
DAR AL TAKAFUL	D25_DALE	2.76E-01	2.99E-01	0.4555



Institution	β_0^s
D1_DIB	1.22383
D3_EMI	2.7416
D6_AJ	0.4421
D14_IAI	0.2928
D24_TE	0.1405
D25_DALE	0.1272

Figure 9 Dubai: Islamic Institution Systemic risk contribution

Table 16 Malaysia Realised Systemic Risk and Time Variability				
		H1	H2	H3
HONG LEONG BANK	M1_HL	2.20E-16	2.20E-16	
AFFIN HOLDINGS BHD	M2_AFF	2.20E-16	2.20E-16	
CIMB GROUP HOLDINGS	M6_CIM	2.20E-16	2.20E-16	
RHB BANK BHD	M9_RHB	2.20E-16	2.20E-16	
ALLIANCE FINANCIAL GP.	M10_ALL	2.12E-01	2.12E-01	2.12E-01

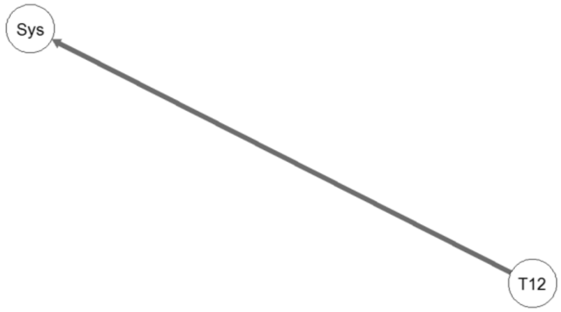


Institution	β_0^s
M1_HL	6.88
M2_AFF	5.345
M6_CIM	5.862
M9_RHB	5.799

Figure 10 Malaysia: Islamic Institution Systemic risk contribution

In Malaysia, all Islamic banks are systemically relevant and have time variability, except for one institution (ALLIANCE FINANCIAL GP). In Turkey, one Islamic bank is systemically relevant and has also variability effect on the system.

Table 17 Turkey Realised Systemic Risk and Time Variability				
		H1	H2	H3
VAKIF FINANSAL KIRALAMA	T12_VFK	2.20E-16	2.20E-16	



Institution	β_0^s
T12_VFK	0.68642

Figure 11 Turkey: Islamic Institution Systemic risk contribution

I find that there are commonalities in Middle Eastern countries when it comes to Islamic banks systemic relevance, and I find new results about Islamic insurance, which is new to the literature. In Saudi Arabia, two Takaful firms (ALAHLI TAKAFUL COM and SABB TAKAFUL) and one bank (SAMBA BANK) with an Islamic window, are relevant and encounter a time-variability in their effect on the financial system.

Abu Dhabi institutions include three Islamic banks and three Islamic insurance companies. All are systemically relevant and have time-variability in their effect on the system. Only one institution (ABU DHABI NATIONALTAKAFUL) is systemically relevant due to its characteristics.

For Dubai, most Takaful institutions are systemically relevant and all Islamic banks are relevant. In Jordan, two Islamic banks (JORDAN DUBAI ISLAMIC BK and JORDAN ISLAMIC BANK) are systemically relevant and have time variability in their effect on the financial system, due to the change in their business performance and their risk exposures.

For Oman, all three Islamic institutions (BANK NIZWA, AL MADINA INVESTMENT and OMAN UNITED INSURANCE) are systemically relevant where one Islamic insurance company's characteristics have a time variable effect on financial system (OMAN UNITED INSURANCE).

Generally, the above results about the Middle Eastern countries (Bahrain, Oman, Saudi Arabia, Dubai, Abu Dhabi and Jordan, Turkey) in my sample, indicate that the significance test done in H1 implies that macroeconomic variables have a significant effect on the relevance of many Islamic institutions. These economies have strong-state intervention on large banks. This leads to market concentration, where large banks (either Islamic or conventional) become monopolistic or oligopolistic, and tend to negatively affect the profitability and efficiency of other financial institutions and promote financial distress (Mizaei et al. 2013).

Moreover, I find interesting results about Islamic insurance companies or "Takaful". Previously, I find that Islamic insurance companies act as risk drivers or channels in most financial networks. They also affect more Islamic banks than conventional banks. My realised systemic risk analysis provides further implications about Islamic insurance financial distress. Apparently, they are systemically relevant and as outlined in the literature about insurance business, Islamic Takaful's business profiles turn to affect system's stability over time (Kader et al.2014). Although the nature of their business is different to normal banking, they share common problems with Islamic banks. They suffer from poor performance, inefficiency, troubles in handling operational costs and re-investing insurers' money in admissible options that will reap high return. Their business has substantial deficiencies in management boards, and conflict of interest and transparency problems which make them hazardous. What is worrying is this branch of Islamic banking that is growing and penetrating conventional markets without having proper policies and regulations to govern its performance. This implies that supervisors in the Islamic banking sector and Islamic insurance market should be alert to operational problems and use and allocation of capital. This would improve liquidity, minimise cost to income ratio, and reduce propensity to failure and contribution to systemic risk.

To summarise, results indicate that Islamic banks are systemically relevant, and they significantly contribute to systems' realised systemic risk. Moreover, most Islamic banks' systemic risk contribution is driven by specific characteristics. In other words, financial linkages are not the only factor that explain Islamic banks' financial distress, but the change in their own risks overtime also plays an important role in magnifying systemic risk. Finally, for those Islamic banks with insignificant results in H1 and H2, I test whether their expected conditional VaRs have significant impact on the system. I find that most Islamic banks with no time variability in their systemic risk contribution, their expected conditional VaRs have a significant effect on the financial system.

In the next section, I show the procedure undertaking to validate my model specification and discuss the findings of this research relative to previous studies.

4.6 Robustness: CoVaR Model Validity

For each institution, I test the significance for loss exceedances in VaR specification using the quantile regression version developed by Koenker and Bassett (1982). Given the F-test for joint significance test, I decide whether each loss exceedance is significant and relevant to CoVaR. Results show that the selected loss exceedances are significant in most cases. This indicates that connections between institutions are primarily justified by loss exceedances. Moreover, I follow Adrian and Brunnermeier (2011) and compare estimated CoVaR model with all risk drivers and the estimated CoVaR model with macroeconomic variables only. Results confirm the previous validity test, and assure that the model predictability is better and has higher back testing p-values when loss exceedances are included.

4.7 Discussion

In this section, I will discuss my empirical results and their contribution to the research upon two main points. First, one of the most important findings of post-LASSO quantile regression and network analyses show that not only conventional banks have significant tail-risk spillover effects, but Islamic banks also do with significant effect on conventional and other Islamic banks. Islamic banks turn to act as risk drivers and risk channels as conventional banks do within the financial system. Although, publicly available data cannot empirically justify the economic reasons for such linkages between the selected institutions, I include institution-specific and macroeconomic variables in my model specification. By doing this, I rule out any possibility that linkages are driven by overall increasing volatility level or sudden drop in a country's credit rating. Accordingly, tail-risk spillovers are likely to be explained by remaining factors such as Islamic banks' own risks and business model commonalities.

Possible reasons include the similarity in the business model of conventional and Islamic banks (Beck et al. 2013). Other studies also find no difference between the performance of Islamic and conventional banks in terms of efficiency and insolvency risk (El-Gamal and Inangolo, 2005; Abedifar et al. 2013), and in terms of financial stability (Cihak and Hesse, 2010; Bourkhis and Nabi (2013). My results are new to the literature, because Islamic banks are theoretically promoted as a safe banking alternative and promote financial development social welfare (Khediri et al. 2015; Olson and Zoubi, 2008; Abedifar et al 2016). For Islamic banks, which appear to act as risk recipients, I intuitively justify that by the insufficiency of risk management practices, and being helpless if the counterparty defaults (Djennas, 2016). The competitive pressure Islamic banks face may make them seek high-risk projects to overcome their limited access to finance.

Second, my research generally finds that Islamic banks contribute to systemic risk the same as their conventional peers do. The joint significance test shows that most Islamic banks are systemically relevant. Even more, there is a time-variability in systemic risk contribution of a number of Islamic banks, due to their own specific-characteristics. This can be attributable to liquidity issues and the larger operational risk in the Islamic banking sector compared to conventional banks. According to Pappas et al. (2016), such problems make Islamic Banks more prone to financial distress and failure risk. In addition, Muslim countries' economies are mainly emerging or frontier and have improper supervision and regulations regarding information disclosure and business performance (Errico and Farahbaksh, 1998).

Moreover, I find a variation in the role of Islamic banks in the financial system across countries. This is possibly explained by two reasons.

First, the different market structures play important roles in defining network connections. Most economies in my research (Bahrain, Oman, Saudi Arabia, Dubai, Abu Dhabi, Jordan and Turkey) have strong-state intervention on large banks. This leads to market concentration, where large banks (either Islamic or conventional) become monopolistic or oligopolistic, and negatively affect the profitability and efficiency of other financial institutions and promote financial distress (Mizaei et al. 2013). In such countries, macroeconomic variables will not be reflective of the general economic state and financial institutions' risk and network connections are the main drivers of systemic risk. My results confirm this. When I incorporate unique macroeconomic variables to Islamic countries' economies to the model specification (main industries indices, Budget Balance to GDP, Budget Debt to GDP, and other variables), they are mostly excluded because the significance of network connections outweighs them. Other countries such as Malaysia and Indonesia are mixed economies, with minimum intervention by the government.

Second, different Shari'ah standards are applied by Islamic banks across countries. Some follow AAOIFI, others follow Islamic Financial Services Board's (IFSB) standards which are mainly applied in South-East Asia, and the rest simply follow the Central Banks for the countries where they operate. These standards relate to the admissible leverage levels, financial contract terms and other operational elements in the Islamic banking sector. Hence, Islamic banks' relevant risk drivers and financial distress would vary too.

After demonstrating a detailed discussion about my research findings, in the next section I will provide the concluding remarks and implications of this chapter.

4.8 Conclusion and Implications

Islamic banking sector has witnessed an exponential growth in its market share, due to the increasing Muslim population and its theoretical promotion as a more stable and safer banking alternative after the financial crisis. However, various studies analysed the characteristics and risks in Islamic banks and find that they suffer from significant liquidity issues, operational risks and withdrawal risks. Other studies also find that Islamic banks are inefficient and prone to failure during financial instability and economic distress. This raises the question regarding the viability of interest-free banking and its role in increasing or decreasing systemic risk in the financial system.

Accordingly, this research contributes to the literature in three ways. First, I examined the effect of the financial distress of Islamic banks on other financial institutions by utilising penalised-quantile regressions and financial network analyses. I determined whether a financial institution is distressed or not, by considering its specific characteristics, macroeconomic variables and the loss exceedances of other financial institutions. Second, I investigated the systemic relevance of Islamic banks by estimating the realised systemic risks given the relevant factors of each institution's financial distress. Third, if an Islamic bank turned out to be systemically relevant, I examined whether there is a time-variability in its systemic contribution, due to its own specific characteristics and risks.

I used weekly balance sheet, macroeconomic and market data for 352 financial institutions in 10 majority Muslim countries from the beginning of January 2010 to the end of December 2015. I focused on this period in particular, because the Islamic banking sector has witnessed 47% growth since 2014 (Ernst and Young, 2016). I focused on the period from 2010 to 2015, because previous empirical evidence was in favour of Islamic banks and showed that they are less vulnerable to instabilities during the peak of the financial crisis. In addition, given the market share of the Islamic sector during and after the crisis, this period is significant to investigating the given research problem as the sector has exponentially grown after the financial crisis.

My findings showed that Islamic institutions are generally similar to conventional institutions and have significant tail-risk spillovers on conventional and other Islamic financial institutions. Islamic banks turned out to act as risk drivers and risk channels the same as conventional banks do within the financial system. For Islamic banks, which appear to act as risk recipients, I intuitively justified that by the insufficiency of risk management practices, and being helpless if the counterparty defaults (Djennas, 2016).

Second, my research generally found that Islamic banks contribute to systemic risk the same as their conventional peers do. The joint significance test showed that most Islamic banks are systemically relevant. Even more, there is a time-variability in systemic risk contribution of a number of Islamic banks, due to their own specific-characteristics. Yet, I found a variation in the role of Islamic banks in the financial system.

Third, further joint significance tests showed that Islamic banks are systemically relevant and in fact, most Islamic banks' effects on the system are driven by their specific characteristics (significant time-variability). For those Islamic banks with no time variability in their systemic risk contribution, their stress stands to be significant to the financial system.

Overall, this research has important contributions to the systemic risk measurement and network analysis literature, with implications for researchers and regulators in Muslim countries with dual financial systems. It is important to researchers, practitioners and regulators in light of the exponential growth in the Islamic banking sector.

Future research may address the financial distress of Islamic banks during the financial crisis. Also, combining bottom-up approaches in systemic risk measurement alongside survival analysis model such as that suggested by Pappas et al. (2016) would be useful to develop a warning system of Islamic banks' distress and failure.

Technically, the effect of differences in each country's regulatory standards should be reflected on the balance sheet variables included in this research. In addition, Indonesian banks for example follow AAOIFI, while Saudi Arabia follows IFSB. Indonesian banks cannot operate in Saudi Arabia. If they could open, they face difficulty in operating as a foreign bank, due to many restrictions. I can account for the differences in the regulatory standards by checking which balance sheet accounts are affected by those regulations, and measure the significance of variances across banks' distress across countries (where banks have overseas subsidiaries. However, this would be a diversion from the scope of this research.

For regulators, if Islamic banks and financial authorities did not address the routes of inefficiency, insolvency risk, and withdrawal risk in Islamic banks, they will continue to contribute to financial systems' distress. With such propensity to failure and high business risks, the viability of an interest-free banking scheme is questionable without proper risk management practices and governing rules for Islamic banks' performance.

Table 2 Financial Institutions Names and Acronyms

++ fully fledged Islamic bank
** has an Islamic bank unit

Financial Institutions in Turkey

GARANTI FAKTORING	T1_GF	AVRASYA PEL.VE TURISTIK TESISLER YTM.	T21_AP
FINANSIAL.KIRALAMA **	T2_FF	IS YATIRIM MEN	T22_IYM
ATLAS MENKUL KIYMETL	T3_AMY	TEKFEN HOLDING	T23_TH
GSD DENIZCILIK	T4_GEND	ECZACIBASI YATIRIM	T24_EY
GEN YATIRIM HOLDING	T5_GYH	ANEL ELEKTRIK PROJE	T25_AEP
GLOBAL YATIRIM HLDG.	T6_GY	CREDITWEST FAK	T26_CF
ECZACIBASI YATIRIM	T7_EY	GOZDE GIRISIM	T27_GG
GEDIK YATIRIM	T8_GEDY	GEDIK YATIRIM MENKUL	T28_GYM
IS FINANSAL KIRALAMA	T9_IFK	MARTI GAYRIMENKUL	T29_MG
RHEA GIRISIM SERMAYESI YATOTA.	T10_RG	INFO YATIRIM	T30_IY
SEKER FINANSAL KIRALAMA	T11_SFK	AKDENIZ GUVENL	T31_AG
VAKIF FINANSAL KIRALAMA++	T12_VFK	AVRASYA MENKUL KIYM	T32_AMK
TRANSTURK HOLDING	T13_TH	ATA GAYRIMENKUL	T33_ATAG
VAKIF MENKUL KIYMET	T14_VMK	MAZHAR ZORLU HOLDING	T34_MZH
KAPITAL YATIRIM HOLD	T15_KYH	GARANTI YATIRIM ORTA	T35_GYO
METRO GAYRIMENK	T16_MG	HACI OMER SABANCI HLDG.	T36_HOS
ARTI YATIRIM HOLD	T17_AYH	VERUSA HOLDING	T37_VH
FON SINAI YAT	T18_FSY	TURKIYE KALKINMA	T38_TK
GEDIK GIRISIM	T19_GEDG	ALTERNATIFBANK	T39_AB
OYAK YATIRIM ORTAKLIGI	T20_OYO		

Financial Institutions in Abu Dhabi

ABU DHABI COMMERCIA	A1_ADC	AL BUHAIRA NATIONAL IN.	A18_ABO
ABU DHABI ISLAMIC BANK++	A2_ADI	EMIRATES INSURANCE	A19_EI
BANK OF SHARJAH ++	A3_BOS	ABU DHABI NATIONAL IN.	A20_ADO
COMMERCIAL BANK INT	A4_CBI	FUJAIRAH NATIONAL IN.	A21_AF
NATIONAL BK.OF ABU DHABI	A5_OB	AL KHAZ0 INSURANCE	A22_AKI
NAT.BANK OF FUJAIRAH	A6_OBF	AL WATHBA INSURANCE CO.	A23_AW
SHARJAH ISLAMIC BANK ++	A8_SI	UNION INSURANCE	A24_UnionI
UNION NATIONAL BANK	A9_UOB	UNITED INSURANCE	A25_UI
FIRST GULF BANK	A10_FGB	ABU DHABI NATIONALTAKAFUL++	A26_ADT
UNITED ARAB BANK	A11_UAB	SHARJAH INSURANCE	A27_SINSU
NATIONAL BANK OF UMM	A12_OBU	AL DHAFRA INSURANCE	A28_ADINSU
INVEST BANK PSC	A13_IBP	RAS AL KHAIMAH	A29_RASK
FINANCE HOUSE PJSC	A14_FHP	METHAQ TAKAFUL IN.CO. ++	A30_MT
AXA GREEN CRES	A15_AGC	INSURANCE HOUSE	A31_INSUH
WATANIYA TAKAFUL ++	A16_WT		
AL AIN AL AHLIA IN.CO.	A17_AAA		

Financial Institutions in Bahrain

AHLI UNITED BANK BSC	B1_AUB	BAHRAIN MIDDLE EAST BANK	B13_BME
ARAB BANKING CORPORATION++	B2_ABC	ESTERAD INVESTMENT CO.	B14_EI
BAHRAIN ISLAMIC BANK ++	B3_BIB	SECURITIES & INVESTMENT	B15_SAI
BBK BSC	B4_BBK	UNITED GULF INV.CORP.	B16_UG
GULF FINANCE HOUSE ++	B5_GFH	INVESTCORP BANK SA	B17_INVB
TAIB BANK BSC ++	B6_TBB	BAHRAIN COMMERCIAL FACS.	B18_BCOM
UNITED GULF BANK BSC	B7_UGB	AL AHLIA INSURANCE CO.	B19_AHLINS
AL SALAM BANK ++	B8_ASB	BAHRAIN KUWAIT IN.CO.	B20_BK
ITHMAAR BANK BSC ++	B9_IB	BAHRAIN NATIONAL HOLDING	B21_BO
AL BARAKA BANKING GROUP**	B10_ALB	TAKAFUL INTL.CO. ++	B22_TAKI
KHALEEJI COMMERCIAL BANK++	B11_KHC	ARAB INSURANCE GROUP	B23_ARINS
NATIONAL BANK OF BAHRAIN	B12_OB		

Financial Institutions in Dubai

DUBAI ISLAMIC BANK ++	D1_DIB	ISLAMIC ARAB INSURANCE++	D14_IAI
COMMERCIAL BANK OF DUBAI	D2_CB	ALLIANCE INSURANCE	D15_ALL

EMIRATES ISLAMIC BANK++	D3_EMI	DUBAI INSURANCE CO	D16_DIC
MASHREQ BANK	D4_MB	DUBAI NATIONAL INS	D17_DOI
EMIRATES NBD	D5_NBD	NATIONAL GENERAL IN.	D18_OG
AJMAN BANK ++	D6_AJ	OMAN INSURANCE COMPANY	D19_OIC
AMLAK FINANCE PJSC	D7_AFP	ARABIAN SCANDINAVIAN	D20_ALEABS
DUBAI INVESTMENTS	D8_DI	AL SAGR NAT.INSURANCE	D21_ALST
SHUAA CAPITAL	D9_SHC	DUBAI ISLAMIC INSURANCE++	D22_DI
EMIRATES INVEST	D10_EMI	ORIENT INSURANCE	D23_OI
DUBAI FINANCIAL MARKET	D11_DF	TAKAFUL EMARAT PJSC ++	D24_TE
GULF GENERAL INVESTMENT	D12_GGI	DAR AL TAKAFUL++	D25_DALE
Financial Institutions in Indonesia			
BANK NUSNT.PARAHYANGAN	I1_BN	BANK MASPION INDONESIA	I34_MASP
BANK OCBC NISP	I2_BON	BANK MITRANIAGA TBK	I35_MITR
BANK PEMBANGUNAN DAERAH BANTEN	I3_BP	BANK MAYAPADA INTSL.	I36_MAYA
BANK OF INDIA INDONESIA	I4_PTB	BANK PANIN DUBAI **	I37_PANI
BANK MNC INTERNASIONAL	I5_BMI	BANK AGRIS TBK PT	I38_BAT
BANK QNB INDONESIA	I6_BQI	BANK YUDHA BHAKTI	I39_BY
BANK MANDIRI ++	I7_BM	BANK HARDA INTERNASIONAL	I40_BHI
BANK RAKYAT INDONESIA++	I8_BRI	DANASUPRA ERAPACIFIC	I43_DE
PT BANK MEGA TERBUKA ++	I9_PBM	SINAR MAS MULTIARTHA	I44_SMM
BANK CENTRAL ASIA ++	I10_BCA	NUSANTARA INTI CORPORA	I45_NIC
PT BANK BUMI ARTA ++	I11_BUMI	POLARIS INVESTAMA	I46_PI
PT BANK BUKOPIN TBK **	I12_BUKO	KRESNA GRAHA INVESTAMA	I47_KG
BANK WOORI	I13_WOO	ARTHAVEST TBK PT	I48_ATP
BANK DANAMON INDONESIA**	I14_DAM	MNC KAPITAL INDONESIA	I49_MNC
BANK INTL INDONESIA	I15_BII	TRUST FINANCE INDONESIA	I50_TFI
BANK CIMB NIAGA TBK **	I16_BCN	PACIFIC STRATEGIC FINL.	I51_PAC
BANK PERMATA TBK **	I17_PER	TRIMEGAH SEKURITAS INDONESIA	I52_TS
BANK WINDU KENTJANA	I18_KENT	PT PANIN SEKURITAS	I53_PTP
BANK CAPITAL INDO.	I19_CAP	ADIRA DINAMIKA MLT.FIN.	I54_AD
BANK RAKYAT IND ++	I20_AGR	HD CAPITAL TBK PT	I55_HD
BANK EKONOMI RAHARJA DEAD	I21_EKON	YULIE SEKURINDO	I56_YS
BANK TABUNGAN PENSIUNAN NASIONAL ++	I22_TAB	WAHANA OTTOMITRA	I57_WO
BANK ARTHA GRAHA INTSL.	I23_BAG	PANCA GLOBAL SECURITIES	I58_PG
BANK VICTORIA INTL. ++	I24_VIC	RELIANCE SECURITIES	I59_RS
BANK PEMBANG	I25_PMB	MANDALA MULTIFINANCE	I60_MM
BANK SINARMAS TBK PT	I26_SIO	LIPPO SECURITIES TBK	I61_LS
BANK PAN INDONESIA	I27_PAN	POOL ADVISTA INDONESIA	I62_PAV
BANK INA PERDANA	I28_PERD	EQUITY DEVELOPMENT INV.	I63_ED
BANK PMBGN.DAERAH JAWA TIMUR	I29_PEMB	CAPITALINC INVESTMENT SUSP	I64_CI
BANK DINAR INDONESIA	I30_DIOR	BUANA FINANCE TBK PT	I65_BF
BANK NATIONALNOBU	I31_OTIO	BFI FINANCE INDONESIA	I66_BFI
BANK NEGARA INDONESIA	I32_NEG	ONIX CAPITAL TBK PT	I67_ONIX
BANK MESTIKA DHARMA	I33_MEST	VERENA MULTI FINANCE	I68_VERO
		CLIPAN FINANCE INDONESIA	I69_CLIP
		BATAVIA PROSPERINDO FIN.	I70_BATP
		BANK TABUNGAN NEGARA	I71_TABU
		EVERGREEN INVESCO	I72_EVR
		RADANA BHASKARA FINANCE	I73_RB
		TIFA FINANCE TBK PT	I74_TIFA
		SARATOGA INVESTAMA SEDAYA	I77_SARA
		VICTORIA INVEST	I78_VIC
Financial Institutions in Jordan			
ARAB BANK GROUP	J1_AB	NATIONAL PORTFOLIO SECS.	J20_OP
JORDAN KUWAIT BANK	J2_JKB	EJADA FOR FINANCIAL	J21_EFF
BANK OF JORDAN	J3_BOJ	UNITED FINANCIAL INV	J22_UFI

ARAB BANKING CORP	J4_ABC	JORDANIAN EXPATRIATE	J23_JE
CAIRO AMMAN BANK	J5_CA	SOCIETE GENERALE	J24_SG
CAPITAL BANK OF JORDAN	J6_CB	AL	J25_AM
JORDAN COMMERCIAL BANK	J7_JC	ZARA INVESTEMENT HOLDING	J26_ZARA
HOUSING BANK	J8_HB	ARAB EAST FOR RESINV.	J27_AEFR
JORDAN AHLI BANK	J9_JAB	AL ISRA FOR EDUCATION	J28_ISRA
BANK AL ETIHAD PSC	J10_BAE	BINDAR TRADING	J29_BIND
JORDAN ISLAMIC BANK ++	J11_JIB	JORDAN LOAN GUARANTE	J30_JLG
CENTURY INVESTMENT GROUP	J12_CIG	INTERNATIONAL BROKER	J31_IBF
UNION INVESTMENT	J13_UI	THE CONSULTANT & INV.GP.	J32_TCI
JORDAN DUBAI ISLAMIC BK.++	J14_JDI	AL MAL	J33_AMAL
JORDAN INVESTMENT TRUST	J15_JI	AL FARIS NATIONAL IN	J34_FAR
ARAB FINANCIAL INVES	J16_AFI	FIRST FINANCE ++	J35_FF
SPECIALIZED JORDANIA	J18_SJ	BABELON INVESTMENTS	J36_BI
AL SHARQ	J19_SAQ	NOOR CAPITAL	J37_NC

Financial Institutions in Malaysia

HONG LEONG BANK++	M1_HL	KUCHAI DEVELOPMENT	M18_KUD
AFFIN HOLDINGS BHD ++	M2_AFF	AEON CREDIT SERVICE	M19_ACS
BIMB HOLDINGS BERHAD	M3_BIMB	MALAYSIA BUILDING SOC.	M20_MB
HONG LEONG FIN	M4_HLF	ECM LIBRA FINANCIAL GP.	M21_ECM
AMMB HOLDINGS BERHAD	M5_AMM	HWANG CAPITAL	M22_HWA
CIMB GROUP HOLDINGS++	M6_CIM	ELK DESA	M23_ELK
MALAYAN BANKING BHD	M7_MAL	K & N KENANGA HDG.	M24_K&N
PUBLIC BANK BHD	M8_PUB	SONA PETROLEUM BHD	M25_PET
RHB BANK BHD++	M9_RHB	MAA GROUP	M26_MAA
ALLIANCE FINANCIAL GP. ++	M10_ALL	PACIFIC & ORIENT BHD	M27_PAC
RCE CAPITAL BHD	M11_RCE	LPI CAPITAL BHD	M28_LPI
OSK VENTURES INTN'L	M12_OSK	ALLIANZ MALAYSIA	M29_AM
BURSA MALAYSIA BHD	M13_BUR	MNRB HOLDINGS BHD	M30_MHB
OSK HOLDINGS	M14_OSK	TUNE PROTECT GROUP	M31_TIH
APEX EQUITY HOLDINGS	M14_APEX	MPHB CAPITAL	M32_MPHB
KAF	M15_KAF	SYARIKAT TAKAFUL MAL.	M33_SYA
HONG LEONG CAPITAL	M16_HLC	MANULIFE HOLDINGS	M34_MANH
JOHAN HOLDINGS BHD	M17_JH		

Financial Institutions in Oman

NATIONAL BANK OF OMAN	O1_OT	AL OMANIYA FINANCIAL	O19_AMF
BANK DHOFAR SAOG	O2_DHO	SHUROOQ INV.SERVICES	O20_SHQ
BANK SOHAR	O3_SOH	THE FINANCIAL CORP.	O21_TFC
BANK NIZWA ++	O4_NIZ	TAAGEER FINANCE	O22_TAG
HSBC BANK OMAN SAOG	O5_HSBC	GULF INVESTMENT SERVICE	O23_GINV
BANK MUSCAT	O6_MUS	OMAN ORIX LEASING	O24_OOL
FINANCIAL SERVICES	O7_FIN	OMAN INTERNATIONAL	O25_OI
AL BATINAH DV&IT.	O8_BAT	DHOFAR INTL.DEV.& INV.	O26_DHO
MUSCAT FINANCE	O9_MUS	DHOFAR INSURANCE	O27_DHOIS
NATIONAL SECURITIES	O10_SEC	MUSCAT NATIONAL HOLDING	O28_MUH
AL ANWAR HOLDING	O11_ANW	OMAN UNITED INSURANCE++	O29_OUI
AL MADINA INVESTMENT ++	O12_MADI		
OMAN AND EMIRATES	O13_OEH		
OMAN NAT.INV.CORP.HLDG. DEAD	O14_OI		
GLOBAL FINANCIAL INV.	O15_GF		
UNITED FINANCE CO	O16_UF		
AHLI BANK	O17_AB		
National Finance CO	O18_OFC		

Financial Institutions in Pakistan

BANK AL HABIB LTD ++	P1_COM
ASKARI BANK LIMITED ++	P2_AB
SONERI BANK LTD	P3_SB

HABIB METROPOLITAN		P4_HMB	
NATIONAL BK OF PAKISTAN ++		P5_OBP	
MEEZAN BANK LTD. ++		P6_MBL	
BANK ALFALAH LTD ++		P7_BAL	
UNITED BANK LIMITED		P8_UB	
ALLIED BANK LTD		P9_ALB	
BANK OF PUNJAB		P10_BOP	
MCB BANK LTD		P13_MCB	
NIB BANK LIMITED		P14_NIB	
STANDARD CHARTERED ++		P16_SC	
HABIB BANK LTD		P17_HB	
SILKBANK LTD		P19_SIL	
FAYSAL BANK LIMITED		P20_FBL	
Financial Institutions in Saudi Arabia			
BANK ALBILAD ++	S1_ALB	SALAMA COOP	S27_SAL
ALINMA BANK ++	S2_ALI	ARABIAN SHIELD COOP.IN.	S28_ASHI
AL RAJHI BANKING ++	S3_RAJ	SAUDI UTD.COOP.INSURANCE	S29_SUC
BANQUE SAUDI FRANSI**	S4_SFAR	SANAD COOPERATIVE IN.	S30_SADI
ARAB NATIONAL BANK	S5_ARB	ALLIANZ SDI.FRNASI COIN.	S31_ALL
BANK ALJAZIRA ++	S6_JAZ	ALLIED COOP.IN.GROUP	S32_ALLC
RIYAD BANK	S7_RIB	SAUDI INDIAN COMPANY	S33_SIC
SAMBA FINANCIAL GROUP**	S8_SAMB	SAUDI ARABIAN COOP.IN.	S34_ACO
SAUDI BRITISH BANK	S9_SBB	GULF UNION COOPE	S35_GUC
THE SAUDI INVESTMENT BK.	S10_SINV	AL-AHLIA INSURANCE	S36_AHL
NATIONAL COMMERCIAL BANK	S12_COM	ARABIA INSURANCE COOP.	S37_AINS
AL AHSA DEVELOPMENT	S13_AHS	TRADE UNION COOP.IN.	S38_TUC
SAUDI ADVANCED INDS.	S14_SADV	AL SAGR COPT.IN.	S39_SAG
SAUDI INDUSTRIAL DEV.	S15_SC	SAUDI REINSURANCE	S40_SREIN
SAUDI INDL.SERVICES	S16_SIND	UNITED COOP.ASSURANCE	S41_COA
NATIONAL INDUSTRIAL	S17_IND	WEQAYA TAKAFUL IN&R. SUSP++	S42_WTI
KINGDOM HOLDING CO	S18_KHC	AL RAJHI FOR COOPERA	S43 FC
ASTRA INDUSTRIAL GROUP	S19_AIG	AXA COOPERATIVE IN.	S44_AXA
ALAHLI TAKAFUL COM ++	S21_TAK	ACE ARABIA COOP.IN.	S45_ACE
BUPA ARABIA FOR COOP.IN.	S22_BUP	AL ALAMIYA FOR COIN.CO.	S46_ALA
THE COMPANY FOR COOP.IN.	S23_TOC	GULF GENERAL COOP.IN.CO.	S47_GGC
THE MEDIT.& GULF IN&R.	S24_MED	BURUJ COOP.IN.CO.ORD	S48_BUR
MALATH COOP.IN.& REIN.	S25_MALC	SOLIDARITY SAUDI TAKAFUL++	S50_SOL
SABB TAKAFUL++	S26_SABT		

Chapter 5: Conclusion

5.1 Introduction

Motivated by the theoretical background about the relationship between religion and economics, this research aimed to contribute to the literature of Islamic banking and finance by investigating two main issues; i) the diversification benefits of Shari'ah compliant equity and the systemic relevance of Islamic banks in dual financial systems. Theoretical and empirical literature lacks evidence about the viability of Shari'ah complaint financing as an alternative for better investment performance and stability of financial systems. Previous empirical evidence is comparative rather than experimental. It tends to compare risk, returns and business risks of Shari'ah compliant investments or Islamic banks to their conventional peers.

I addressed these research gaps by: i) proving whether Shari'ah investments can offer any potential diversification benefits for portfolio managers during turbulent market conditions and ii) investigating the systemic relevance of Islamic banks in the financial system.

I started this thesis by demonstrating the general literature and theoretical background of my research questions in Chapter 2 and I critically discussed the findings of previous studies about the performance of Shari'ah compliant investments and Islamic banks. However, prior literature showed mixed results regarding the performance of Islamic assets in developed and emerging markets. I extended this line of enquiry in Chapter 3 by investigating whether or not adding Shari'ah compliant investments to a portfolio of emerging market investments would improve its risk-adjusted return. This is motivated by the "neglect effect hypothesis" by Hong and Kacperczyk (2009) and Modern portfolio theory (MPT) by Markowitz (1952). The research motivation was testing the effect and benefits of Islamic investments on a high volatility portfolio in emerging markets. I focused on these markets in particular, because they have absorbed many regional and international shocks resulting in emerging market investments suffering extensive losses and becoming very volatile.

What is more, I took a holistic approach and investigated the effect of Islamic banks' financial distress within 10 Majority Muslim countries' financial networks in Chapter 4. This research contributed to the literature about financial stability and was driven by the proposed framework by Adrian and Brunnermier (2011) and Hautsch et al. (2015). I focused on individual financial institutions' distress, given their specific characteristics, macro-economic variables and linkages. Previous literature focused on the individual risks of Islamic banks or the effect of macroeconomic variables on Islamic banks' performance. Hence, I contributed to the existing literature by identifying "too-connected to fail" institutions (including Islamic banks). Again, this enabled me to experiment and identify the role of Islamic banks in financial systems, and quantify their systemic risk contributions. Previous research focused only on systemic risk measurement in developed markets such as the USA and Germany, and found that insurance firms are the greatest contributors to systemic risk.

No research to my knowledge has questioned the tail-risk spillovers in financial networks by considering the role of Islamic banks in financial systems.

In this chapter, I will provide a summary of the main results, implications, recommendations and limitations of this thesis.

5.2 Summary of the Main Results

Using 17 ETFs' data from a broad range of conventional emerging equity and fixed income securities alongside with Shari'ah complaint ETFs over the period of 2009 to 2015, I found that the inclusion of Shari'ah compliant ETFs can improve risk-adjusted returns of an emerging market portfolio.

In particular, I used dynamic and static portfolio optimisation strategies to find the optimal asset allocation over two sample periods. My results indicated that Shari'ah compliant equity may be preferred by investors over conventional emerging market equity and fixed income-securities, especially during the recent years of 2012 to 2015 when most ETFs in my sample experienced negative average returns.

However, this was not the case for the post global financial crisis and the European debt crisis period (01/2009 - 04/2012) where fixed-income ETFs got the highest weight in the portfolio. On the contrary, the statistic strategy favoured fixed-income ETFs mostly in all my sample periods.

Using monthly portfolio rebalancing, I found that dynamic strategies over-performed the static strategy from January-2009 to April-2012; while, static strategy resulted in more performance gains in the out-of-sample period from May-2012 to December-2015.

Moreover, using data of 352 financial institutions in 10 Muslim majority countries, I identified the exogenous shock to financial institutions caused by the interconnectedness between i) Islamic banks, ii) financial market, iii) the economy and iv) other financial institutions. My findings showed that there are significant tail-risk spillovers from Islamic banks to other financial institutions in the network of most countries in my research, except in Bahrain and Turkey where Islamic banks were found to be risk recipients. This is also in line with the side of literature which finds no difference between Islamic and conventional banks performance.

I estimated also the relevance of Islamic banks to financial systems using a systemic risk measure called marginal CoVaR, and found that most Islamic banks in my sample are systemically relevant and contribute to the risk of financial systems. There were some variations in Islamic banks' contribution across countries, which stemmed from the differences in the economic systems and the regulatory requirements in the selected countries. These findings shed light on the need for extensive reforms in the Islamic banking sector.

Finally, I performed a joint significance test to determine whether there is a time-variability in the effect of Islamic banks on the system, due to their specific performance characteristics. I found that there was a significant time-variability in the effect of many Islamic banks, which indicated that individual risks of Islamic banks drive their financial distress and lead to spillover effects in financial systems. For those Islamic banks with no time variability in their systemic risk contribution, their financial distress stood to be significant to the financial system.

5.3 Summary of the Main Implications

Institutional investors should consider the religion effect when they manage their assets, given the evidence regarding the outperformance of Shari'ah compliant equity relative to their conventional peers. Particularly, research findings indicated that Shari'ah compliant equity ETFs are less sensitive to the turbulence in financial markets; hence, they are important in stabilising an emerging market portfolio. For asset allocation strategies, there is no perfect strategy which can work all the time. After I considered different portfolio optimisation strategies, one should be cautious when using dynamic strategies, because they can be more costly to apply specially in volatile markets such as emerging markets and during crisis periods.

For central banks and regulator, they should consider Islamic banks as genetically modified conventional banks (Pfeifer, 2001). If Islamic banks and financial authorities did not address the routes of inefficiency, insolvency risk, and withdrawal risk in Islamic banks, they will continue to contribute to financial systems' distress. Otherwise, Islamic banks would be money pools of conservative Muslims and a financing alternative for non-Muslims and governments to maintain a certain level of financial diversification.

5.4 Recommendations for Further Study

By connecting the lack of evidence in the literature on the utilisation of Shari'ah compliant finance and banking alternatives in the existing conventional setting, it opens a new door for future research about proposing mechanisms Shari'ah complaint businesses can apply to hedge against financial shocks originating not only from advanced economies, but also from emerging market economies. Future research should concentrate on the economic value of such strategies in emerging markets, by considering elements such as transaction costs due to rebalancing and performance fees for switching from one strategy to another.

Furthermore, the research findings showed that crisis effect on returns was due to the regional and global integration between developed and emerging markets, and the growing cross-border nature of banking and financial services. This encourages future research to identify the extent to which responsible regional institutions are needed to monitor market conditions and maintain financial stability. Financial crises in developing countries may not necessarily materialise, because of individual financial institutions' distress only, but because of governments' failure as well.

Generally, the global financial crisis in 2008 has encouraged the initiation of substantial reforms in the financial systems, and motivated many researchers to develop warning systems of any future crises. Although, it is difficult to establish a global regulator which can be enforced in all economies, it is important that we (as researchers and practitioners) acknowledge the necessity of a regulatory framework which enforces a minimum consistency in jurisdictions which would apply in similar markets. With the absence of consistent regulations regarding cross-border information, arbitrage and data sharing, international financial systems will remain exposed to systemic risk.

Also, international regulations should consider emerging market economies, because they are growing as important financial systems. Accordingly, future research can develop a framework, which provides the regulator with a measure of financial distress of an individual financial institution and time expectancy if it is going to fail in the near future. This framework can help regulators impose adequate standards and controls over financial institutions, to protect them from possible financial turbulence due to macroeconomic reasons. Otherwise, it can prevent them from taking inadequate and extremely risky positions. It is an early idea for a new project, which needs interdisciplinary specialization (computer science, psychology, physics), but it is futuristic and this is what financial authorities need.

5.5 Limitations

- **Methodological Limitation**

For Chapter 3, the number of models for initiating and optimising portfolios is very large. Some institutional investors employ one or more models which are suitable for their portfolio's objectives and business needs. I used two models which represent the two ends of a complexity spectrum models. The first is the static model and the second is the DCC model. There are other models which can provide further stylised facts to answer my research question. However, due to their computational complexity and interdisciplinary nature (physics and computer science), I decided to work with the static and DCC models only.

For Chapter 4, modelling systemic risk is a relatively new topic in the financial literature. Though, econometrics models are exposed to issues related to standard assumptions about data (e.g. normality). Other mathematical based models which are based on complexity theory could be used in the future to avoid the standards data assumptions.

- **Data Limitations**

I could not include frontier markets as part of my research sample in Chapter 3, because they have small market capitalization and they do not offer daily liquidity through ETFs. Also, there is only one frontier ETF available during the research sample period (2009-2015); Guggenheim Frontier Markets ETF (inception date 06/12/2008). From 2012, only two frontier ETFs became available: iShares MSCI Frontier 100 ETF (09/13/2012), Global X Next Emerging & Frontier ETF (inception date 11/06/2013).

Moreover, I could not predict the period until banks fail in Chapter 4, because this requires different models and data. The contribution of this chapter is focused more on the scale of data I collected and the network effect amongst institutions and the overall financial system. Combining the estimation of the period until it fails and its vulnerability to financial distress would require data which is currently not available. It is a methodological contribution which is not relevant to the research problem under investigation. The problem with data available on DataStream and Bankscope is that it assumes that Islamic and conventional banks share same traits and their stability is affected by similar factors. In order to realise better results on Islamic banks' performance, product-specific data (e.g. Murabaha or Musharakah) is required. However, such data is not available in a structured and organised way, and it is limited and not accessible by researchers.

5.6 Final Remarks

In conclusion, this thesis presented two researches, namely in portfolio management, systemic risk measurement and network analysis. In the first research, Shari'ah compliant ETFs improved the risk-adjusted return in the sample period when most ETFs in emerging market economies had negative average returns, and emerging markets experienced high volatility levels. The second research proved that the Islamic banking sector is wrongly promoted as equitable and a promoter of social welfare, because of their propensity to failure and high business risks. It raises questions about the viability of an interest-free banking scheme, without having proper risk management practises and governing rules for Islamic banks' performance.

The results of both researches are not contradictory, but they rather complement each other. The first research focuses on portfolio management, where the main drivers of the optimal portfolios are the correlation between assets and their volatility levels. Shari'ah compliant equity was selected, because its risk and return are advantageous in case it is allocated to a portfolio of emerging market investments. The second research focused on the whole financial system. It investigated the effect of Islamic banks, and found that their financial distress is relevant to other financial institutions and the financial system. It also proved that risks associated with Islamic banking sector outweigh its positives such as prevention of speculation, low leverage levels and asset backed financing.

References

Abadie, A. (2002) Bootstrap tests for distributional treatment effects in instrumental variable models. *Journal of the American statistical Association*, 97(457), pp. 284-292.

Abdullah, F., Hassan, T. and Mohamad, S. (2007) Investigation of performance of Malaysian Islamic unit trust funds: Comparison with conventional unit trust funds. *Managerial Finance*, 33(2), pp. 142-153.

Abedifar, P., Hasan, I. and Tarazi, A. (2016) Finance-growth nexus and dual-banking systems: Relative importance of Islamic banks. *Journal of Economic Behavior and Organization*, 132, pp. 198-215

Abedifar, P., Molyneux, P., and Tarazi, A. (2013) Risk in Islamic banking. *Review of Finance*, 17(6), pp. 2035-2096.

Acharya, V. V., Pedersen, L. H., Philippon, T. and Richardson, M. P. (2010) Measuring systemic risk. *Review of Financial Studies*, 30(1), pp. 2-47.

Adrian, T. and Brunnermeier, M. (2010) Covar: A systemic risk contribution measure. Tech. rep., Princeton University.

Adrian, T. and Brunnermeier, M. K. (2011) CoVaR (No. w17454). National Bureau of Economic Research.

Aggarwal, R.K. and Yousef, T. (2000) Islamic banks and investment financing. *Journal of Money, Credit and Banking*, 32(1), pp. 93–120.

Aizenman, J. and Pasricha, G. (2010) Determinants of Financial Stress and Recovery during the Great Recession. *NBER Working Paper Series*, 16605, NBER, Massachusetts.

Ajmi, A., Hammoudeh, S., Nguyen, D. and Sarafrazi, S. (2014) How strong are the causal relationships between Islamic stock markets and conventional financial systems? Evidence from linear and nonlinear tests. *Journal of International Financial Markets, Institutions and Money*, 28, pp. 213-227.

Aka, J., 2009. Shari'ah investing: through bull and bear markets? SEI investments (Middle East), October 2009. [Online] Available from www.seic.com/enME/about/MiddleEast/SEI-Shariah-BullAndBearMarkets.pdf. [Accessed 18/01/2013]

Alam, N., Hassan, M.K. and Haque, M.A. (2013) Are Islamic bonds different from conventional bonds? International evidence from capital market tests. *Borsa Istanbul Review* 13(3), pp. 22–29.

Albaity, M. S., and Mudor, H. (2012) Return performance, Cointegration and short run dynamics of Islamic and non-Islamic indices: evidence from the US and Malaysia during the subprime crisis. *Atlantic Review of Economics*, 1(1), pp. 8-21.

Alexander, C. (2001) *Market models: A guide to financial data analysis*. John Wiley & Sons.

Al-Hajieh, H., Redhead, K. and Rodgers, T. (2011) Investor sentiment and calendar anomaly effects: a case study of the impact of Ramadan on Islamic MiddleEastern markets. *Res. Int. Bus. Finan*.,25 (3), pp. 345–356.

Al-Hassan, A., Oulidi, N. and Khamis, M. (2010) The GCC banking sector: Topography and analysis. International Monetary Fund Working Papers.

Al-Khazali, O. (2014). Revisiting fast profit investor sentiment and stock returns during Ramadan. *Int. Rev. Finan. Anal*, (33), pp.157–170

Al-Khazali, O., Lean, H., and Samet, A. (2013) Do Islamic stock indexes outperform conventional stock indexes? A stochastic dominance approach [Online]. *Pacific-Basin Finance Journal*. http://www.sciencedirect.com/science/article/pii/S0927538X13000644 [Accessed 07/04/2014].

Al-Muharrami, S. (2008) An examination of technical, pure technical and scale efficiencies in GCC banking. *American Journal of Finance and Accounting*, 1(2), pp. 152–166.

Al-Muharrami, S., Matthews, K. and Khabari, Y. (2006) Market structure and competitive conditions in the Arab GCC banking system. *Journal of Banking & Finance*, *30*(12), pp. 3487-3501.

Al-Rifai, T. (2012) Why have Shari'ah compliant indexes outperformed conventional Indexes since the crisis? Business Islamica. [Online] Available from: http://businessislamica.com/2012/05/02/why-have-shariah-compliant-indexes-outperformedconventional- indexes-since-the-crisis/ [Accessed 15/01/2013].

Al-Zoubi, H. and Maghyereh, A. (2007) The relative risk performance of Islamic finance: a new guide to less risky investments. *International Journal of Theoretical and Applied Finance*, 10 (2), pp. 235-249.

Anderson, G. M. (1988) Mr. Smith and the preachers: the economics of religion in the wealth of nations. *Journal of Political Economy*, *96*(5), pp. 1066-1088.

Ang, A. and Bekaert, G. (2002) International asset allocation with regime shifts. *Review of Financial Studies*, 15, pp. 1137–1187.

Arouri, M., Ben Ameur, H., Jawadi, N., Jawadi, F. and Louchini, W. (2013) Are Islamic finance innovations enough for investors to escape from a financial downturn? Further evidence from portfolio simulations. *Applied Economics*, 45 (24), pp. 3412-3420.

Azmat, S., Skully, M. and Brown, K (2014) Credit risk in Islamic joint venture bond. *Journal of Economic Behavior and Organization*, 103, pp.129–145

Azzi, C. and Ehrenberg, R. (1975) Household allocation of time and church attendance. *Journal of Political Economy*, *83*(1), pp. 27-56.

Baele, L., Farooq, M. and Ongena, S. (2014) Of religion and redemption: Evidence from default on Islamic loans. *Journal of Banking and Finance*, 44(6), pp. 141–159.

Baixauli, J. And Alvarez, S. (2006) Evaluating effects of excess kurtosis on VaR estimates: Evidence for international stock indices. *Review of Quantitative Finance and Accounting*, 27(1), pp. 27-46.

Balakrishnan, R., Danninger, S., Elekdag, S. and Tytell, We. (2011) The transmission of financial stress from advanced and emerging economies. *Emerging Markets Finance and Trade*, 47(2), pp.40–68.

Bank Indonesia Report (2009) *The Lack of Profit-and-Loss Sharing Financing in Indonesia's Islamic Bank.* [Online] Available from: http://www.isahp.org/2009Proceedings/Final_Papers/5_Ascarya_REV_FIN.pdf [Accessed 15/01/2014].

Barro, R.J., McCleary, R. (2003) Religion and economic growth. NBER Working Paper 9682.

Basov, S., and Bhatti, M. I. (2014) On Sharia'a-compliance, positive assortative matching, and return to investment banking. *Journal of International Financial Markets, Institutions and Money*, *30*, pp. 191-195.

Bauer, R., Otten, R. and Rad, A. (2006) Ethical investing in Australia: is there a financial penalty? *Pacific Basin Finance Journal*, 14, pp. 33–48.

Beck, T., Demirgüc¸ -Kunt, A. and Levine, R., (2000a) A new database on financial development and structure. *World Bank Economic Review*, 14 (3), pp. 597–605.

Beck, T., Demirgüç-Kunt, A. and Merrouche, O. (2013) Islamic vs. conventional banking: Business model, efficiency and stability. *Journal of Banking and Finance*, 37(2), pp. 433-447.

Beck, T., Demirgüç-Kunt, A. and Levine, R. (2010) Financial institutions and markets across countries and over time: The updated financial development and structure database. *The World Bank Economic Review*, 24(1), pp. 77-92.

Behr, P., Guettler, A. and Miebs, F. (2013) On portfolio optimization: Imposing the right constraints. *Journal of Banking & Finance*, 37, pp. 1232–1242.

Beit-Hallahmi, B. and Argyle, M. (1997) The Psychology of Religious Behaviour. Belief and Experience. Routledge, London

Bekaert, G., Erb, C.B., Harvey, C.R. and Viskanta, T.E. (1998) Distributional characteristics of emerging market returns and asset allocation. *The Journal of Portfolio Management,* 24(2), pp. 102-116.

Belloni, A. and Chernozhukov, V. (2011) l1-penalized quantile regression in high-dimensional sparse models. *The Annals of Statistics*, 39, pp. 82–130.

Benoit, S., Colliard, J.-E., Hurlin, C. and Pérignon, C. (2016) Where the risks lie: A survey on systemic risk. *Review of Finance*, p. rfw026

Berkowitz, J., Christoffersen, P. and Pelletier, D. (2011). Evaluating value-at-risk models with desk-level data. *Management Science*, *57*(12), pp. 2213-2227.

Bernal, O., Gnabo, J. Y. and Guilmin, G. (2014) Assessing the contribution of banks, insurance and other financial services to systemic risk. *Journal of Banking and Finance*, 47, pp. 270-287.

Bettendorf, L., and Dijkgraaf, E. (2010) Religion and income: Heterogeneity between countries. *Journal of Economic Behavior & Organization*, *74*(1), 12-29.

Białkowski, J., Etebari, A., and Wisniewski, T. P. (2012) Fast profits: Investor sentiment and stock returns during Ramadan. *Journal of Banking & Finance*, *36*(3), 835-845.

Billio, M., Getmansky, M., Lo, A. W. and Pelizzon, L. (2012) Econometric measures of connectedness and systemic risk in the finance and insurance sectors. *Journal of Financial*

Economics, 104(3), pp.535-559.

Bisias, D., Flood, M. D., Lo, A. W. and Valavanis, S. (2012) A survey of systemic risk analytics. US Department of Treasury, Office of Financial Research, (0001).

Blackburn, K. and Forgues-Puccio, G. F. (2010) Financial liberalization, bureaucratic corruption and economic development. *Journal of International Money and Finance*, *29*(7), pp. 1321-1339.

Bley, J., and Chen, K. H. (2006) Gulf Cooperation Council (GCC) stock markets: The dawn of a new era. *Global Finance Journal*, *17*(1), pp. 75-91.

Bollerslev, T. (1990) Modelling the coherence in short-run nominal exchange rates: a multivariate generalized ARCH model. *The Review of Economics and Statistics*, pp. 498-505.

Bollerslev, T., and Wooldridge, J. M. (1992) Quasi-maximum likelihood estimation and inference in dynamic models with time-varying covariances. *Econometric reviews*, *11*(2), pp. 143-172.

Bollerslev, T., Engle, R.F., Wooldridge, J.M., (1988) A Capital Asset Pricing Model with Time-Varying covariances. *Journal of political Economy*, 96(1), 116-131.

Bourkhis, K. and Nabi, M. S. (2013) Islamic and conventional banks' soundness during the 2007–2008 financial crisis. *Review of Financial Economics*, *22*(2), pp. 68-77.

Brown, S. (1976) Optimal portfolio choice under uncertainty: a Bayesian approach. Ph.D. Dissertation, University of Chicago.

Brownlees, C. T. and Engle, R. (2010) Volatility, correlation and tails for systemic risk measurement. Publisher not identified.

Bryman, A., Bell, E. (2015) Business research methods. Oxford University Press.

Burrell, G. and Morgan, G. (1979) Sociological paradigms and organizational analysis (248).

London: Heinemann.

Bursztyn, L., Fiorin, S., Gottlieb, D. and Kanz, M. (2015) Moral incentives: experimental evidence from repayments of an Islamic credit card (No. w21611). National Bureau of Economic Research.

Cakir, S. and Raei, F. (2007) Sukuk vs. Eurobonds: Is There a Difference in Value-at-Risk? *International Monetary Fund Working Paper*, WP/07/237.

Callen, T., P. Khandelwal, K. Miyajima, and A. Santos (2015) Oil Prices, Financial Stability, and the Use of Countercyclical Macroprudential Policies in the GCC, prepared for the Annual Meeting of Ministers of Finance and Central Bank Governors.

Calvo, S. and Reinhart, C. (1996) Capital flows to Latin America: is there evidence of contagion effects? *World Bank Policy Research Working Paper*, 1619.

Campbell, J.Y. and Hentschel, L (1992) No news is good news: An asymmetric model of changing volatility in stock returns. *Journal of Financial. Economic*, 1992, 31(3), pp. 281-318

Cappiello, L., Engle, R. and Sheppard, K. (2006) Asymmetric dynamics in the correlations of global equity and bond returns. *Journal of Financial Econometrics*, 4 (4), pp. 537–572.

Carr, J. L. and Landa, J. T. (1983) The economics of symbols, clan names, and religion. *The Journal of Legal Studies*, *12*(1), pp. 135-156.

Castro, C. and Ferrari, S. (2014) Measuring and testing for the systemically important financial institutions. *Journal of Empirical Finance*, 25, pp.1-14.

Central Bank of Malaysia and Securities Commission Malaysia, 2009. Malaysian Debt Securities and Sukuk Market. Central Bank of Malaysia.

Central Intelligence Agency CIA world factbook (2016) [Online] Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/us.html [Accessed

19/05/2017].

Chen, K., Ying, Z., Zhang, H. and Zhao, L. (2008) Analysis of least absolute deviation. *Biometrika*, pp.107-122

Chevallier, J. (2012) Time-varying correlations in oil, gas and CO2 prices: an application using BEKK, CCC and DCC-MGARCH models. *Applied Economics*, *44*(32), pp. 4257-4274.

Chiswick, B.R. (1983) The earnings and human capital of American Jews. *Journal of Human Resources*, 18, pp. 313–336.

Chiswick, B.R. (1993) The skills and economic status of American Jewry: trends over the last half-century. *Journal of Labor Economics*, 11, pp. 229–242.

Chong, B.S. and Liu, M.H. (2009) Islamic banking: Interest-free or interest-based?. *Journal of Pacific-Basin Finance* 17(1), pp.125–144

CIA world factbook (2017) Online] Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/us.html [Accessed 19/05/2017].

Cihak, M and Hesse, H. (2010) Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, 38, pp. 95–113.

Claessens, S., Dasgupta, S. and Glen, J. (1995) Return behaviour in emerging stock markets. *World Bank Economic Review*, 9, pp.131–151.

Colacito, R., Engle, R. F. and Ghysels, E. (2011) A component model for dynamic correlations. *Journal of Econometrics*, 164(1), pp. 45-59.

Curcio, R. J., Lipka, M. J. and Thornton, J. H. (2004) Cubes and the Individual Investor. *Financial Services Review*, 13(2), pp.123-138.

Davis, C. (1962) The norm of the Schur product operation. *Numerische Mathematik*, *4*(1), pp 343-344.

De Santis, G. and Imrohoroglu, S. (1997). Stock market and volatility in emerging markets. *Journal of International Money and Finance*, 15(6), pp. 561-579.

Delacroix, J. (1992). A critical empirical test of the common interpretation of the protestant ethic and the spirit of capitalism. In *meetings of Int. Assoc. Business & Society in Leuven, Belgium*.

Demiguel, V., Garlappi, L. and Uppal, R. (2009) Optimal versus naive diversification: how inefficient is the 1/N portfolio strategy?. *Review of Financial Studies,* 22, pp. 1915–1953.

Demirgüç-Kunt, A. and Detragiache, E. (1998) The determinants of banking crises in developing and developed countries. *Staff Papers*, *45*(1), pp.81-109.

Derigs, U. andMarzban, S. (2008) Review and analysis of current Shariah-compliant equity screening practices.

Desdoigts, A., 1999. Patterns of economic development and the formation of clubs. Journal of Economic Growth, 4, pp.305–330.

Dharani, M., and Natarajan, P. (2011) Seasonal anomalies between S&P CNX Nifty Shariah index and S&P CNX Nifty index in India. *Journal of Social and Development Science,1* (3), pp. 101-108.

Diamond, D. W. and Rajan, R. G. (2000) A theory of bank capital. *The Journal of Finance*, *55*(6), pp. 2431-2465.

Diamond, D. W. and Rajan, R. G. (2001) Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of political Economy*, *109*(2), pp. 287-327.

Diebold, F. X., and Yilmaz, K. (2012) Better to give than to receive: Predictive directional measurement of volatility spillovers. *International Journal of Forecasting*, 28(1), pp. 57-66.

Djennas, M. (2016) Business Cycle Volatility, Growth And Financial Openness: Does Islamic Finance Make Any Difference?. *Borsa Istanbul Review*, *16*(3), pp. 121-145.

Dommisse, A. and Kazi, W. (2005) Securitisation and shariah law. *Banker Middle East*, 1 July, pp. 7-8.

Dornbush, R., Park, Y. and Claessens, S. (2000) Contagion: understanding how it spreads. *World Bank Research Observer,* 15, pp. 177–197.

Dovern, J. and Van Roye, B. (2013) International Transmission of Financial Stress: Evidence from GVAR. *Kiel Working Papers* No. 1844. Kiel Institute for World Economy, Kiel.

Duchin, R. and Levy, H. (2009) Markowitz versus the Talmudic: portfolio diversification strategies. *Journal of Portfolio Management*, 35 (2), pp. 71–74.

Ehrenberg, R. G. (1977) Household allocation of time and religiosity: Replication and extension. *Journal of Political Economy*, *85*(2), pp.415-423.

Ekelund, R. B., Hébert, R. F., and Tollison, R. D. (1989) An economic model of the medieval church: usury as a form of rent seeking. *Journal of law, economics, & organization*, *5*(2), pp. 307-331.

El Alaoui, A. O., Dewandaru, G., Rosly, S. A. and Masih, M. (2015) Linkages and co-movement between international stock market returns: Case of Dow Jones Islamic Dubai Financial Market index. *Journal of International Financial Markets, Institutions and Money*, *36*, pp. 53-70.

Elfakhani, S., Kabir, H. and Sidani, Y. (2005) Comparative performance of Islamic versus secular mutual funds. In *12th Economic Research Forum Conference in Cairo, Egyp*t (pp. 19-21).

El-Gamal, M and Inanoglu, H. (2005) Inefficiency and heterogeneity in Turkish banking.

Journal of Applied Econometrics, 20, pp. 641–664.

Engle, R. (2002) Dynamic conditional correlation: a simple class of multivariate generalized autoregressive conditional heteroskedasticity models. *Journal of Business and Economic Statistics* 20 (3), pp. 339–350.

Engle, R. and Bollerslev, T. (1986) Modelling the persistence of conditional variances. *Econometric reviews*, *5*(1), pp. 1-50.

Engle, R. and Colacito, R. (2006) Testing and Valuing Dynamic Correlations for Asset Allocation. *Journal of Business & Economic Statistics*, 24 (2), pp. 238-253

Engle, R. and Sheppard, K. (2001) Theoretical and empirical properties of dynamic conditional correlation MVGARCH, (No. w8554). National Bureau of Economic Research.

Engle, R. F. and Manganelli, S. (2004) CAViaR: Conditional autoregressive value at risk by regression quantiles. *Journal of Business & Economic Statistics*, *22*(4), pp. 367-381.

Engle, R.F. and Granger, C. W. J. (1987) Co-integration and error correction: representation, estimation, and testing, *Econometrica* 55, pp.251–276.

Engle, R.F. and Kroner, K.F. (1995) Multivariate Simultaneous Generalized ARCH. *Econometric Theory*, 11, pp. 122-150.

Ernst and Young (2016) World Islamic Banking Competitiveness Report 2016. [Online] Available from: http://www.ey.com/Publication/vwLUAssets/ey-world-islamic-banking-competitiveness-report-2016/$FILE/ey-world-islamic-banking-competitiveness-report-2016.pdf. [Accessed: 15/08/2016]

Errico, L. and Farrahbaksh, M. (1998) Islamic banking: issues in prudential regulation and supervision. IMF Working Paper No. 98/30.

Fleming, J., Kirby, C. and Ostdiek, B. (2003). The economic value of volatility timing using “realized” volatility. *Journal of Financial Economics*, *67*(3), pp. 473-509

Fleming, J., Kirby, C., and Ostdiek, B. (2001) The economic value of volatility timing. *The Journal of Finance*, *56*(1), pp. 329-352.

Fletcher, J. (2009) Risk reduction and mean-variance analysis: an empirical investigation. *Journal of Business Finance and Accounting*, 36 (7-8), pp. 951–971.

Frieder, L., Subrahmanyam, A., 2004. Non-secular regularities in returns and volume. Financial Analysts Journal 60 (4), pp. 29–34.

Gavriilidis, K., Kallinterakis, V. and Tsalavoutas, I. (2015) Investor mood, herding and the Ramadan effect. *Journal of Economic Behavior & Organization*, 132, pp. 23–38

Gay, C. M. (1991) With liberty and justice for whom. *The Recent Evangelical Debate Over Capitalism*, pp. 101-109.

Gheeraert, L. (2014). Does Islamic finance spur banking sector development?. Journal of economic behavior and organization, 103, S4-S20.

Gheeraert, L., and Weill, L. (2015) Does Islamic banking development favor macroeconomic efficiency?. Evidence on the Islamic finance-growth nexus. *Economic modelling*, *47*, pp. 32-39.

Girardi, G. and Ergün, A. T. (2013) Systemic risk measurement: Multivariate GARCH estimation of CoVaR. *Journal of Banking and Finance*, 37(8), pp. 3169-3180.

Glaeser, E. L. and Scheinkman, J. (1998) Neither a borrower nor a lender be: an economic analysis of interest restrictions and usury laws. *The Journal of Law and Economics*, *41*(1), pp. 1-36.

Glosten, L. R., Jagannathan, R., and Runkle, D. E. (1993) On the relation between the expected value and the volatility of the nominal excess return on stocks. *The journal of finance*, *48*(5), pp. 1779-1801.

Goles, T., Hirschheim, R. (2000) The paradigm is dead, the paradigm is dead…long live the paradigms: The legacy of Burrell and Morgan. *Omega*, 28, pp.249–268.

Greif, A. (1994) Cultural beliefs and the organization of society: A historical and theoretical reflection on collectivist and individualist societies. *Journal of political economy*, *102*(5), pp. 912-950.

Hakim, S., Rashidian, M. (2002) Risk and return of Islamic stock market indexes. Islamic Economics and Finance Pedia. [Online] Available from: http://www.erf.org.eg/CMS/uploads/pdf/1185350388_F-P_Sam_Rashidian.pdf [Accessed 07/04/2014]

Hanna, M., Kiymaz, H. and Perdue, G. (2001) Portfolio diversification in a highly inflationary emerging market. *Financial Services Review*, 10(1), pp. 303-314.

Hardy, L. (2012) The evolution of participation banking in Turkey. Al Nakhlah Online Journal of Soutwest Asia and Islamic Civilization. Available from http://fletcher.tufts.edu/~/media/Fletcher/Microsites/al%20Nakhlah/archives/Winter2012/Hardy_Final.pdf Accessed 19/06/2017

Harvey, C. R. (1989) Time-varying conditional covariances in tests of asset pricing models. *Journal of Financial Economics*, 24(2), pp. 289-317.

Hasan, M., and Dridi, J. (2010) The effects of the global crisis on Islamic and conventional banks: A comparative study. International Monetary Fund.

Hassan, M. and Girard, E. (2011) Faith-based ethical investing: the case of Dow Jones Islamic indexes. *Networks Financial Institute Working Paper*, (2011-WP), 06.

Hastie, T. and Qian, J. (2014) Glmnet Vignette. [Online] Available from: https://web.stanford.edu/~hastie/glmnet/glmnet_alpha.html#int [Accessed: 29/08/2016).

Hautsch, N., Schaumburg, J. and Schienle, M. (2015) Financial network systemic risk contributions. *Review of Finance*, 19, pp. 685-738.

Hautsch, N., Schaumburg, J., and Schienle, M. (2014) Forecasting systemic impact in financial networks. *International Journal of Forecasting*, 30, pp. 781–794.

Hayat, R. and Krauessl, R. (2011) Risk and return characteristics of Islamic equity funds. *Emerging Markets Review*, *12*(2), pp.189-203.

Healey, R. M. (1984) Jefferson on Judaism and the Jews:" Divided we stand, united, we fall!". *American Jewish History*, *73*(4), pp. 359-374.

Heath, W.C., Waters, M.S., Watson, J.K. (1995) Religion and economic welfare: an empirical analysis of state per capita income. Journal of Economic Behavior & Organization 27, pp. 129–142.

Ho, C., Abd Rahman, N., Yusuf, N. And Zamzamin, Z. (2013) Performance of global Islamic versus conventional share indices. Pacific-Basin Finance Journal [Online] Available from http://dx.doi.org/10.1016/j.pacfin.2013.09.002 [Accessed 09/05/2014]

Ho, C., Abdrahman, N., Yusuf, N. and Zamzamin, Z. (2013) Performance of global Islamic versus conventional share indices. *Pacific-Basin Finance Journal* [Online] Available from http://dx.doi.org/10.1016/j.pacfin.2013.09.002 [Accessed 09/05/2014]

Hoepner, A., Rammal, H. and Rezec, M. (2011) Islamic mutual funds' financial performance and international investment style: evidence from 20 countries. *The European Journal of Finance*, 17 (9-10), pp. 829-850.

Hong, H., and Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, *93*(1), pp. 15-36.

Huang, X., Zhou, H. and Zhu, H. (2009) A framework for assessing the systemic risk of major financial institutions. *Journal of Banking and Finance*, 33(11), pp. 2036-2049.

IMF (2004) TECHNICAL NOTE: CONDITIONOF THE BANKING SYSTEM. International Monetary Fund. Available from: https://www.imf.org/external/pubs/ft/scr/2005/cr05157.pdf Accessed 19/06/2017

Investment Support and Promotion Agency of Tureky (June, 2016) Financial Services Sector in Turkey.[Online] Available from: http://www.invest.gov.tr/en-US/infocenter/publications/Documents/FINANCIAL.SERVICES.INDUSTRY.pdf [Accessed 19/06/2017]

IQBAL, M.M., 2010. Prohibition of interest and economic rationality. *Arab Law Quarterly*, 24(3), pp. 293-308.

Ismail, M. (2016) SUMMARY OF INDONESIA'S FINANCE SECTOR ASSESSMEN-TAsian Development Bank. [Online] Available from https://www.adb.org/sites/default/files/publication/178045/ino-paper-12-2015.pdf [Accessed 19/06/2017

Ismath Bacha, O. (2008) The Islamic interbank money market and a dual banking system: The Malaysian experience. *International Journal of Islamic and Middle Eastern Finance and Management*, 1(3), pp. 210-226.

Jawadi, F., Jawadi, N. and Louchini, W. (2014) Conventional and Islamic stock price performance: An empirical investigation. *International Economics*, 137, pp. 73–87.

Jobson, D. and Korkie, B. (1980) Estimation for Markowitz efficient portfolios. *Journal of the American Statistical Association*, 75, pp. 544–554.

Jondeau, E. and Rockinger, M. (2012) On the importance of time variability in higher moments for asset allocation. *Journal of Financial Econometrics*, 10(1), pp, 84-123

Kader, H. A., Adams, M., Hardwick, P. and Kwon, W. J. (2014) Cost efficiency and board composition under different takaful insurance business models. *International Review of Financial Analysis, 32*, pp. 60-70.

Kalotychou, E., Staikouras, S. and Zhao, G. (2014) The role of correlation dynamics in sector allocation. *Journal of Banking & Finance*, 48, pp. 1-12

Kaminsky, G. and Reinhart, C. (1999) The twin crises: the causes of banking and balance of-payments problems. *American Economic Review,* 89, pp. 473–500.

Kaminsky, G. and Reinhart, C. (2000) On crises, contagion, and confusion. *Journal of International Economics*, 51, pp.145–168.

Katib, M. N. and Kent, M. (2000) A non-parametric approach to efficiency measurement in the Malaysian banking sector. *The Singapore Economic Review,* 44(2), pp. 89-114.

Khan, F. (1991) Comparative economics of some Islamic financing techniques. Research Paper No. 12. IRTI, Islamic Development Bank, Jeddah.

Khan, T. and Ahmed, H. (2001) *Risk management: an analysis of issues in Islamic financial industry*. Islamic Development Bank, Islamic Research and Training Institute.

Khediri, K. B., Charfeddine, L. and Youssef, S. B. (2015) Islamic versus conventional banks in the GCC countries: A comparative study using classification techniques. *Research in International Business and Finance*, *33*, pp. 75-98.

Koenker, R. and Bassett, G. (1978) Regression quantiles. *Econometrica* 46, pp. 33–50

Kose, M. A., Prasad, E., Rogoff, K.and Wei, S. J. (2009) Financial globalization: a reappraisal. *IMF Staff Papers*, *56*(1), pp. 8-62

Kuhn, Thomas S. (1962) *The Structure of Scientific Revolutions* (3rd edition), Chicago, IL: The University of Chicago Press.

Kupiec, P. H. (1995) Techniques for verifying the accuracy of risk measurement models. *The journal of Derivatives*, *3*(2), pp. 73-84.

Kuran, T. (1993) The economic impact of Islamic fundamentalism. *Fundamentalisms and* *the state: Remaking polities, economies, and militance*, 302-41.

Kuran, T. (1995) *Private truths, public lies: The social consequences of preference falsification*. Harvard University Press.

Kuran, T. (1997) Islam and underdevelopment: an old puzzle revisited. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, pp. 41-71.

Lane WR, Looney SW and Wansley JW (1986) An application of the Cox proportional hazards model to bank failure. *Journal of Banking Finance,* 10, pp. 511–31

LEAN, H.H. and PARSVA, P. (2012) Performance of Islamic indices in Malaysia FTSE market: Empirical evidence from CAPM. *Journal of Applied Sciences,* 12(12), pp. 1274-1281.

Ledoit, O., Santa-Clara, P., and Wolf, M. (2003) Flexible multivariate GARCH modeling with an application to international stock markets. *Review of Economics and Statistics*, *85*(3), pp. 735-747.

Loewenstein, G., Weber, E.U., Hsee, C.K. and Welch, N. (2001) Risk as feelings. *Psychological Bulletin*, 127 (2), pp. 267–286

Longin, F. and Solnik, B. (1995) Is the correlation in international equity returns constant: 1960–1990?. *Journal of international money and finance,* 14(1), pp. 3-26.

Longin, F. and Solnik, B. (2001) Extreme correlation of international equity markets. *The Journal of Finance,* 56 (2), pp. 649-676.

López-Espinosa, G., Moreno, A., Rubia, A. and Valderrama, L. (2012) Short-term wholesale funding and systemic risk: A global CoVaR approach. *Journal of Banking and Finance*, 36(12), pp. 3150-3162.

Majid, M. , Yusof, R. , and Razal, A. N. (2007) Dynamic financial linkages among selected

OIC countries. *Journal of Economic Cooperation*, *28*(2), pp.25-56.

Majid, M. ., and Kassim, S. (2010) Potential diversification benefits across global Islamic equity markets. *Journal of Economic Cooperation and Development*, *31*(4), pp. 103-126.

Manlagñit, M. C. V. (2011). The economic effects of foreign bank presence: Evidence from the Philippines. *Journal of International Money and Finance*, *30*(6), pp. 1180-1194.

Männasoo KA and Mayes DG (2009) Explaining bank distress in Eastern European Transition Economies. *Journal of Banking and Finance*, 33, pp. 244–253.

Mansor, F. and Bhatti, M.I. (2011) Risk and return analysis on performance of the Islamic mutual funds: evidence from Malaysia. *Global Economy and Finance Journal,* 4(1), pp. 19-31.

Marashdeh, H. (2005). Stock market integration in the MENA region: An application of the ARDL bounds testing approach. *Faculty of Commerce-Economics Working Papers*, 133.

Markowitz, H. (1952) Portfolio selection. *The journal of finance,* 7(1), pp. 77-91.

Mason Robert (2014) The Omani Pursuit of a Large Peninsula Shield Force: A Case Study of a Small State's Search for Security. *British Journal of Middle Eastern Studies*, pp. 355-367

McKinsey and Company, Islamic Finance Interest Group (2005) Islamic banking competitiveness report, tracking an industry in transition. In: 12th WorldIslamic Banking Conference, Manama, Bahrain.

Merdad, H., Hassan, M.K. and Alhenawi, Y. (2010) Islamic versus conventional mutual funds performance in Saudi Arabia: a case study. *Islamic Economics,* 23(2).

Merton, R. C. (1987) A simple model of capital market equilibrium with incomplete information. *The journal of finance*, *42*(3), pp. 483-510.

Miller, A. S. and Hoffmann, J. P. (1995) Risk and religion: An explanation of gender differences in religiosity. *Journal for the Scientific Study of Religion*, pp. 63-75.

Miller, N. D., Challoner, J., and Atta, A. (2007) UK Welcomes the Sukuk-How the UK Finance Bill Should Stimulate Islamic Finance in London, Much to the Delight of the City's Banks. *Int'l Fin. L. Rev.*, *26*, p. 24.

Milly, M and Sultan, I. (2012) Portfolio diversification during financial crisis: analysis of faith based investment strategies. In Building Bridges Across the Financial Communities: The Global Financial Crisis, Social Responsibility, and Faith-based Finance. *Harvard Law School, Islamic finance project*, pp. 334-352.

Mirzaei, A., Moore, T., and Liu, G. (2013). Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies. *Journal of Banking & Finance*, *37*(8), pp. 2920-2937.

Moser, T. (2003) What is international financial contagion? *International Finance*, 6, pp. 157–178.

Moshirian, F. (2008) Globalization, growth and institutions. *Journal of Banking and Finance*, 32(4), pp. 472-479.

Olson, D and Zoubi, T. (2008) Using accounting ratios to distinguish between Islamic and conventional banks in the GCC region. *International Journal of Accounting*, 43, pp. 45–65.

Orlikowski, W.J. and Baroudi, J.J. (1991) Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2, pp. 1–28.

Osoba, B. (2003). Risk preferences and the practice of religion: Evidence from panel data. *Unpublished Working Paper, West Virginia University*.

Oxford Business Group (2016) Jordan's banking sector leading growth in the financial services sector. [Online] Available from:
https://www.oxfordbusinessgroup.com/overview/still-pillar-led-banking-financial-services-

sector-remains-engine-growth-kingdom [Accessed 19/06/2017]

Pappas, V., Ongena, S., Izzeldin, M. and Fuertes, A. M. (2016) A survival analysis of Islamic and conventional banks. *Journal of Financial Services Research*, pp.1-36.

Park, C. and Mercado JR., R (2014) Determinants of financial stress in emerging market economies. *Journal of Banking & Finance*, 45, pp. 199–224

Pew Research (2015). Why Muslims are the World's Fastest Growing Religious Group. [Online] Available from: <http://www.pewresearch.org/fact-tank/2015/04/23/why-muslims-are-the-worlds-fastest-growing-religious-group/), [Accessed 31/01/ 2017]

Pfeifer, K. (2001). Islamic business and business as usual: a study of firms in Egypt. *Development in practice*, *11*(1), pp. 20-33.

Popper, K. (2005). *The logic of scientific discovery*. Routledge.

Prasad, A. and Bologna, P. (2010) *Oman: banking sector resilience* (No. 10-61). International Monetary Fund.

Pryor, F. L. (1990) A Buddhist economic system—in principle. *American Journal of Economics and Sociology*, *49*(3), pp. 339-349.

Pryor, F.L. (2007) The economic impact of Islam on developing countries. *World Development*, *35(11)*, pp. 1815–1835.

Puzanova, N., and Düllmann, K. (2013) Systemic risk contributions: A credit portfolio approach. *Journal of Banking and Finance*, *37*(4), pp.1243-1257.

Pyle, R. E. (1993) Faith and commitment to the poor: Theological orientation and support for government assistance measures. *Sociology of Religion*, *54*(4), pp. 385-401.

Rajan, R.G. (2006) Has finance made the world riskier?. *European Financial Management*, 12, pp.499-533.

Reinhart, C.M. and Rogoff, K.S. (2009) This Time Is Different: Eight Centuries of Financial Folly. Princeton University Press, Princeton, NJ.

Remenyi, D. (1998) Doing research in business and management: An introduction to process and method. SAGE.

Rodríguez-Moreno, M. and Peña, J. I. (2013) Systemic risk measures: The simpler the better?. *Journal of Banking and Finance*, 37(6), pp. 1817-1831.

Roengpitya, R. and Rungcharoenkitkul, P. (2011) Measuring systemic risk and financial linkages in the Thai banking system. Systemic Risk, Basel III, Financial Stability and Regulation.

Saeed, M. and Izzeldin, M. (2016) Examining the relationship between default risk and efficiency in Islamic and conventional banks. *Journal of Economic Behavior & Organization*, 132, pp. 127–154

Saiti, B., Bacha, O. We. and Masih, M. (2014) The diversification benefits from Islamic investment during the financial turmoil: The case for the US-based equity investors. *Borsa Istanbul Review*, *14*(4), pp.196-211.

Samuelsson, K. (1993) Religion ad Economic Action: the Protestant Ethic, the Rise of Capitalism, and the Abuses of Scholarship.

Saunders, M., Lewis, P., Thornhill, A. and Wang, C. (2009) Analyzing qualitative data. Research methods for business students. 5th edn. Harlow, Essex, UK: Pearson Education Ltd, pp. 480-525.

Segoviano Basurto, M., and Goodhart, C. (2009). Banking stability measures. *IMF working papers*, pp. 1-54.

Seyyed, F., Abraham, A., Al-Hajji, M. (2005) Seasonality in stock returns and volatility: the

Ramadan effect. *Research in International Business and Finance*, 19 (3), pp. 374–383.

Sharpe, W. F. (1994) The sharpe ratio. *The journal of portfolio management*, *21*(1), pp. 49-58.

Sheppard, K. (2002) Understanding the dynamics of equity covariance. *Manuscript, UCSD*.

Shleifer, A., and Vishny, R. W. (1997) The limits of arbitrage. *The Journal of Finance, 52*(1), pp. 35-55.

Siddiqi, M. N. (1981). *Muslim economic thinking: a survey of contemporary literature* (Vol. 1). International Centre for Research in Islamic Economics, King Abdul Aziz University.

Simon, H. A. (1967) Motivational and emotional controls of cognition. *Psychological review*, *74*(1), p. 29.

Smith, A. (1827). *An Inquiry into the Nature and Causes of the Wealth of Nations* (No. 25202). Printed at the University Press for T. Nelson and P. Brown.

Sorwar, G., Pappas, V., Pereira, J. and Nurullah, M. (2016) To debt or not to debt: are Islamic banks less risky than conventional banks?. *Journal of Economic Behavior & Organization*, 132, pp. 113–126

Stark, R. and Bainbridge, W. S. (1985) *The future of religion: Secularization, revival, and cult formation*. University of California Press.

Steen, T.P. (1996) Religion and earnings: Evidence from the NLS Youth Cohort. *International Journal of Social Economics,* 23, pp. 47–58.

Stevenson, S. (2001) Emerging markets, downside risk and the asset allocation decision. *Emerging Markets Review*, 2(1), pp. 50-66.

Sukmana, R. and Kolid, M. (2012) Impact of global financial crisis on Islamic and conventional stocks in emerging market: an application of ARCH and GARCH method. *Asian*

Academy of Management Journal of Accounting & Finance, *31*(2), 357-370.

Sullivan, D. H. (1985) Simultaneous determination of church contributions and church attendance. *Economic Inquiry*, *23*(2), pp. 309-320.

Tawney, R. H. (1926) *Religion and the Rise of Capitalism* (Vol. 23). Transaction publishers.

The European Parliament. (2011). Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Securities and Markets Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/ECOfficial Journal of the European Union. [Online] Available from: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32010R1095 [Accessed : 03/09/2016]

Tibshirani, R. (1996) Regression shrinkage and selection via the lasso, *Journal of the Royal Statistical Society,* Series B 58, pp. 267–288.

Tomes, N. (1984) The effects of religion and denomination on earnings and the returns to human capital. Journal of Human Resources 19, pp. 472–488.

Tomes, N. (1985) Religion and the earnings function. American Economic Review 75, pp. 245–250.

Tse YK and Tsui AKC (2002) A multivariate GARCH model with time-varying correlations. *Journal of Business and Economic Statistics,* 20, pp. 351 – 362

Tu, J. and Zhou, G. (2011) Markowitz meets Talmud: a combination of sophisticated and naive diversification strategies. *Journal of Financial Economics* 99, pp. 204–215.

UK Trade and Investment (2013). UK Excellence in Islamic Finance, downloaded from <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253141/UKTI_UK_Excellence_in_Islamic_Finance.pdf>, [Accessed 13/12/ 2013]

Usmani, M. T. (2007). Sukuk and their contemporary applications. In *Translated from the original Arabic by Sheikh Yusuf Talal DeLorenzo, AAOIFI Shari'a Council meeting, Saudi Arabia*.

Wang, G. J., Xie, C., He, K. and Stanley, H. E. (2017) Extreme risk spillover network: application to financial institutions. *Quantitative Finance*, pp. 1-17.

Wanke, P., Azad, M. and Barros, C. P. (2016) Financial distress and the Malaysian dual banking system: A dynamic slacks approach. *Journal of Banking and Finance*, 66, pp. 1-18.

Weber, M. (1930) The Protestant Ethic and the Spirit of Capitalism. Allen & Unwin, London.

Weerd-Nederhof, P. (2001) Qualitative case study research. The case of a PhD research project on organizing and managing new product development systems. Management Decision, 39, pp. 513–538.

Weill, L. (2011) Do Islamic banks have greater market power?. *Comparative Economic Studies*, 53(2), pp. 291-306.

Wilson, R. (2008) Innovation in the structuring of Islamic sukuk securities. *Humanomics*, *24*(3), pp.170-181.

Wong, A. Y. and Fong, T. P. W. (2011) Analysing interconnectivity among economies. *Emerging Markets Review*, 12(4), pp.432-442.

World Banks (2013) The financial sector is part of Malaysia's success. [Online] Available from:
http://www.worldbank.org/en/news/opinion/2013/06/04/The-financial-sector-part-of-malaysias-success [Accessed 19/06/2017]

Appendix

Chapter 4: Table 5 (Full) Post-LASSO Quantile Regression: VaR 5%

This table shows each institution's estimated VaR, given the relevant risk drivers selected by LASSO.
I only include the quantile regression outputs with at least one significant risk driver.

Saudi Arabia

	Value	Std. Error	t-ratio	p-values
S1_ALB				
Intercept	−2.78923	0.996842	−2.7981	0.0055
CDS	−0.000538719	0.00440572	−0.1223	0.9028
S40_SREIN_LE	0.410084	0.429583	0.9546	0.3405
S41_COA_LE	−0.917759	0.437175	−2.0993	0.0366**
S51_WAT_LE	0.151451	0.349495	0.4333	0.6651
S7_RIB				
Intercept	−1.47544	0.462463	−3.1904	0.0016***
CDS	−0.00430657	0.002584	−1.6666	0.0966*
S41_COA_LE	0.201949	0.105158	1.9204	0.0557*
S42_WTI_LE	−0.243326	0.0635808	−3.8270	0.0002***
S8_SAMB				
Intercept	−2.08415	0.316634	−6.5822	<0.0001
RE	−0.0168267	0.108654	−0.1549	0.8770
S39_SAG_LE	−0.129953	0.408199	−0.3184	0.7504
S41_COA_LE	0.260295	0.331559	0.7851	0.4330
S15_SC				
Intercept	−8.19195	1.05077	−7.7961	0.0001***
S15_SC_PBV	2.45635	0.353347	6.9517	0.0001***
S17_IND				
Intercept	−100.901	38.1254	−2.6466	0.0086***
SRSWC	2.14791	1.20213	1.7868	0.0750**
S38_TUC_LE	−0.0606886	0.586032	−0.1036	0.9176
S39_SAG_LE	−0.143764	0.233172	−0.6166	0.5380
S44_AXA_LE	0.0170467	0.339299	0.0502	0.9600
S45_ACE_LE	0.142746	0.157766	0.9048	0.3663
S17_IND_PBV	1.52805	0.836008	1.8278	0.0686*
S17_IND_SIZE	13.2191	5.4129	2.4422	0.0152***
S17_IND_Return	0.112273	0.129752	0.8653	0.3876
S22_BUP				
Intercept	−1.67479	1.23118	−1.3603	0.1747
BUDGET/GDP	−0.0811606	0.0796839	−1.0185	0.3092
oil	0.070006	0.141132	0.4960	0.6202
S44_AXA_LE	−0.418061	0.0843387	−4.9569	<0.0001***
S28_ASHI				
Intercept	−4.79284	1.37395	−3.4884	0.0006***
oil	−0.131346	0.239269	−0.5489	0.5835
EU	−0.10388	0.452435	−0.2296	0.8186
S28_ASHI_Return	0.381647	0.170502	2.2384	0.0259**
S28_ASHI_PBV	−0.176675	0.470694	−0.3753	0.7077
S4_SFAR_LE	0.941731	0.71019	1.3260	0.1858
S5_ARB_LE	0.704439	0.852428	0.8264	0.4092
S7_RIB_LE	−0.0848327	1.15359	−0.0735	0.9414
S12_COM_LE	−0.235239	1.62229	−0.1450	0.8848
S19_AIG_LE	−0.663039	0.460398	−1.4401	0.1509
S33_SIC_LE	−0.00367284	0.293883	−0.0125	0.9900
S37_AINS_LE	−0.188091	0.405831	−0.4635	0.6434

S39_SAG_LE	0.500294	0.392286	1.2753	0.2032
S40_SREIN				
Intercept	−4.26607	3.28818	−1.2974	0.1955
S40_SREIN_PBV	0.511464	2.02231	0.2529	0.8005
S40_SREIN_Return	0.0738178	0.295571	0.2497	0.8030
IVOL	0.0149	0.0713446	0.2088	0.8347
CDS	0.00452722	0.00518345	0.8734	0.3832
DEBT/GDP	0.0241039	0.0898451	0.2683	0.7887
SASEIDXIndex	−0.00270773	0.122897	−0.0220	0.9824
oil	0.0385613	0.117175	0.3291	0.7423
EU	−0.262365	0.319982	−0.8199	0.4129
S4_SFAR_LE	0.155333	0.357918	0.4340	0.6646
S6_JAZ_LE	0.0958543	0.368786	0.2599	0.7951
S7_RIB_LE	−0.212023	0.550137	−0.3854	0.7002
S13_AHS_LE	−0.335365	0.244364	−1.3724	0.1710
S15_SC_LE	0.599414	0.277985	2.1563	0.0319**
S31_ALL_LE	−0.00516187	0.198955	−0.0259	0.9793
S41_COA_LE	0.255158	0.291985	0.8739	0.3829
S43_RFC_LE	−0.920878	0.40611	−2.2676	0.0241**
S52_AFC_LE	0.0774463	0.234182	0.3307	0.7411
S44_AXA				
Intercept	−4.8182	0.832111	−5.7903	<0.0001***
S44_AXA_Return	0.248355	0.245845	1.0102	0.3132
RE	0.615775	0.37241	1.6535	0.0993*
S4_SFAR_LE	0.418103	1.06118	0.3940	0.6939
S7_RIB_LE	−0.373463	0.850869	−0.4389	0.6610
S9_SBB_LE	0.397161	1.83752	0.2161	0.8290
S52_AFC				
Intercept	−3.03602	1.43417	−2.1169	0.0351**
S52_AFC_PBV	−0.558654	0.173106	−3.2272	0.0014***
S52_AFC_Return	0.221965	0.12648	1.7549	0.0803*
Budge balance to GDP	−0.166686	0.0742423	−2.2452	0.0255**
S14_SADV_LE	0.23746	0.187766	1.2647	0.2070

Turkey				
	Value	Std. Error	t-ratio	p-values
T1_GF				
Intercept	0.0799172	0.66556	0.1201	0.9045
T1_GF_PBV	−1.68064	0.386474	−4.3487	<0.0001***
T1_GF_return	0.241217	0.0477039	5.0565	<0.0001***
XU100 Index	−0.0330624	0.121978	−0.2711	0.7865
DEBT/GDP	−0.0137019	0.113228	−0.1210	0.9038
CDS	−0.0692018	0.0467052	−1.4817	0.1395
T5_GYH_LE	−0.0729578	0.18893	−0.3862	0.6997
T18_FSY_LE	−0.0634098	0.185528	−0.3418	0.7328
T20_OYO_LE	−0.00760866	0.066625	−0.1142	0.9092
T22_IYM_LE	−0.469216	0.234612	−2.0000	0.0464**
T24_EY_LE	−0.172588	0.247852	−0.6963	0.4868
T25_AEP_LE	−1.16047	0.571373	−2.0310	0.0432**
T27_GG_LE	−1.29768	0.358948	−3.6152	0.0004***
T28_GYM_LE	−0.561366	0.263469	−2.1307	0.0339**
T30_IY_LE	−0.0240392	0.121305	−0.1982	0.8430
T32_AMK_LE	−0.0293866	0.388386	−0.0757	0.9397
T34_MZH_LE	−0.284214	0.278967	−1.0188	0.3091
T35_GYO_LE	−0.219722	0.253774	−0.8658	0.3873
T2_FF				
Intercept	−2.83606	0.851205	−3.3318	0.0010***
T2_FF_return	−0.0533536	0.0414225	−1.2880	0.1987
T1_GF_LE	−0.775947	0.0637499	−12.1717	<0.0001***

T4_GEND_LE	0.00589	0.0227161	0.2593	0.7956
T2_FF_LEV	0.439434	0.262746	1.6725	0.0955*
T2_FF_DE	−0.574468	0.460375	−1.2478	0.2130
T3_AMY				
Intercept	−16.4118	5.51541	−2.9756	0.0032***
T3_AMY_SIZE	0.0911808	0.723158	0.1261	0.8998
T3_AMY_PBV	14.7811	2.57667	5.7365	<0.0001***
Banks Sector	−0.0603779	0.0487064	−1.2396	0.2161
RE Sector	0.060915	0.0431454	1.4119	0.1591
IVOL	−0.0296875	0.0660308	−0.4496	0.6533
CDS	−0.00153026	0.0256705	−0.0596	0.9525
T3_AMY_return	0.0786991	0.039811	1.9768	0.0490**
T2_FF_LE	−0.77963	0.0307684	−25.3387	<0.0001***
T4_GEND_LE	−0.00527901	0.0185675	−0.2843	0.7764
T6_GY_LE	0.00419003	0.140358	0.0299	0.9762
T7_EY_LE	0.364313	0.214682	1.6970	0.0908*
T12_VFK_LE	−0.0103507	0.0633622	−0.1634	0.8704
T13_TH_LE	0.107754	0.198105	0.5439	0.5869
T14_VMK_LE	0.0108114	0.0884236	0.1223	0.9028
T15_KYH_LE	−0.0055257	0.0459249	−0.1203	0.9043
T20_OYO_LE	−0.0711935	0.0814299	−0.8743	0.3827
T22_IYM_LE	−0.0836877	0.190332	−0.4397	0.6605
T26_CF_LE	0.0250614	0.203549	0.1231	0.9021
T27_GG_LE	−0.0317074	0.132462	−0.2394	0.8110
T32_AMK_LE	−0.144252	0.175057	−0.8240	0.4106
T34_MZH_LE	−0.0464638	0.18677	−0.2488	0.8037
T39_AB_LE	−14.6424	7.63877	−1.9169	0.0562*
T4_GEND				
Intercept	−0.636302	0.535222	−1.1889	0.2355
T4_GEND_return	0.0659431	0.0121105	5.4451	<0.0001***
XU100 Index	0.146776	0.0205258	7.1508	<0.0001***
RE Sector	−0.124159	0.0258175	−4.8091	<0.0001***
BUDGET/GDP	−5.58678	1.61873	−3.4513	0.0006***
IVOL	−0.0955215	0.0273968	−3.4866	0.0006***
T1_GF_LE	0.126473	0.0701699	1.8024	0.0725*
T3_AMY_LE	−0.88546	0.0108895	−81.3134	<0.0001***
T13_TH_LE	0.00429653	0.0117021	0.3672	0.7138
T16_MG_LE	0.0545234	0.0289845	1.8811	0.0609*
T18_FSY_LE	−0.0284809	0.0334472	−0.8515	0.3952
T19_GEDG_LE	0.0817022	0.0304205	2.6858	0.0076v
T20_OYO_LE	0.00503363	0.00847915	0.5936	0.5532
T21_AP_LE	−0.355461	0.0544943	−6.5229	<0.0001***
T22_IYM_LE	0.0303927	0.0337568	0.9003	0.3687
T23_TH_LE	−0.197587	0.0833976	−2.3692	0.0185**
T25_AEP_LE	0.163275	0.0204054	8.0016	<0.0001***
T28_GYM_LE	−0.11545	0.0445069	−2.5940	0.0100***
T29_MG_LE	−0.0682919	0.0148652	−4.5941	<0.0001***
T5_GYH				
Intercept	7.52579	4.65843	1.6155	0.1073
T5_GYH_return	0.115002	0.0233337	4.9286	<0.0001***
T5_GYH_SIZE	−1.07859	0.714873	−1.5088	0.1325
T5_GYH_MM	−8.51657	9.39669	−0.9063	0.3655
T5_GYH_PBV	−1.5789	2.05247	−0.7693	0.4424
RE Sector	0.0745802	0.0451025	1.6536	0.0993*
DEBT/GDP	−0.0884862	0.113887	−0.7770	0.4378
IVOL	−0.203879	0.0743085	−2.7437	0.0065***
T1_GF_LE	0.213481	0.0945079	2.2589	0.0246
T2_FF_LE	−0.157212	0.102539	−1.5332	0.1263
T4_GEND_LE	−0.914325	0.0450733	−20.2853	<0.0001***

T6_GY_LE	−0.492602	0.281612	−1.7492	0.0813*
T7_EY_LE	−0.225319	0.162027	−1.3906	0.1654
T12_VFK_LE	0.0200265	0.0510213	0.3925	0.6950
T15_KYH_LE	0.0705596	0.0386263	1.8267	0.0688*
T16_MG_LE	0.00229847	0.101169	0.0227	0.9819
T18_FSY_LE	0.195602	0.179754	1.0882	0.2774
T20_OYO_LE	0.0315252	0.0504507	0.6249	0.5326
T23_TH_LE	−0.223384	0.24775	−0.9016	0.3680
T25_AEP_LE	0.0716381	0.218526	0.3278	0.7433
T26_CF_LE	0.216144	0.0897136	2.4093	0.0166**
T28_GYM_LE	−0.273196	0.148413	−1.8408	0.0667*
T36_HOS_LE	−0.201437	0.16948	−1.1886	0.2356
T39_AB_LE	28.7468	17.057	1.6853	0.0930*
T30_IY_LE	−0.109279	0.0989437	−1.1045	0.2703
T6_GY				
Intercept	−1.72196	0.144099	−11.9499	<0.0001***
T6_GY_return	0.0881804	0.0300404	2.9354	0.0036***
XU100 Index	0.00287074	0.0475417	0.0604	0.9519
RE Sector	0.070342	0.0324387	2.1685	0.0309**
T4_GEND_LE	−0.0277222	0.0298557	−0.9285	0.3539
T5_GYH_LE	−0.824277	0.0423382	−19.4688	<0.0001***
T7_EY_LE	−0.172001	0.137159	−1.2540	0.2108
T12_VFK_LE	0.0264296	0.0172786	1.5296	0.1272
T17_AYH_LE	0.0520916	0.030985	1.6812	0.0938*
T19_GEDG_LE	0.0493482	0.0591779	0.8339	0.4050
T20_OYO_LE	−0.134547	0.0370258	−3.6339	0.0003***
T34_MZH_LE	−0.258852	0.0522276	−4.9562	<0.0001***
T7_EY				
Intercept	−1.55758	0.232914	−6.6873	<0.0001***
T7_EY_return	0.136113	0.0900382	1.5117	0.1317
XU100 Index	0.106801	0.0735497	1.4521	0.1475
RE Sector	0.0340942	0.0664262	0.5133	0.6081
DEBT/GDP	−0.0190783	0.0758164	−0.2516	0.8015
T4_GEND_LE	0.0309851	0.00643341	4.8163	<0.0001***
T5_GYH_LE	−0.16737	0.0490327	−3.4134	0.0007***
T6_GY_LE	−0.838287	0.161578	−5.1881	<0.0001***
T8_GEDY_LE	−0.241322	0.157443	−1.5328	0.1264
T10_RG_LE	0.00719703	0.130733	0.0551	0.9561
T21_AP_LE	0.0789416	0.183422	0.4304	0.6672
T22_IYM_LE	0.048088	0.0894783	0.5374	0.5914
T35_GYO_LE	0.0500737	0.0936176	0.5349	0.5931
T36_HOS_LE	−0.0316172	0.303807	−0.1041	0.9172
T8_GEDY				
Intercept	0.318916	1.46878	0.2171	0.8283
T8_GEDY_LEV	−0.578424	0.598069	−0.9672	0.3343
T8_GEDY_PBV	−0.0250933	0.638873	−0.0393	0.9687
DEBT/GDP	−0.11152	0.0409834	−2.7211	0.0069***
IVOL	−0.0216017	0.025707	−0.8403	0.4014
T8_GEDY_return	0.0605689	0.0571399	1.0600	0.2900
T1_GF_LE	0.0651131	0.0527534	1.2343	0.2181
T7_EY_LE	−0.867669	0.0973619	−8.9118	<0.0001***
T9_IFK_LE	0.00376352	0.0489347	0.0769	0.9387
T12_VFK_LE	0.00817907	0.0256844	0.3184	0.7504
T14_VMK_LE	0.0084872	0.0653466	0.1299	0.8968
T15_KYH_LE	−0.0400741	0.0236316	−1.6958	0.0910*
T18_FSY_LE	−0.0241844	0.073044	−0.3311	0.7408
T19_GEDG_LE	−0.0145677	0.0647817	−0.2249	0.8222
T27_GG_LE	−0.208293	0.157981	−1.3185	0.1884
T31_AG_LE	−0.00676846	0.041241	−0.1641	0.8697

T32_AMK_LE	−0.0102433	0.112654	−0.0909	0.9276
T33_ATAG_LE	−0.0239665	0.059937	−0.3999	0.6895
T9_IFK				
Intercept	−2.45746	0.602533	−4.0785	<0.0001***
XU100 Index	0.142855	0.045642	3.1299	0.0019***
RE Sector	0.0206943	0.0612033	0.3381	0.7355
T9_IFK_return	0.0321117	0.0461338	0.6961	0.4869
T6_GY_LE	−0.0537618	0.0250749	−2.1441	0.0328**
T8_GEDY_LE	−0.776919	0.0888772	−8.7415	<0.0001***
T20_OYO_LE	0.0171916	0.0165209	1.0406	0.2989
T21_AP_LE	−0.26831	0.130283	−2.0594	0.0403**
T22_IYM_LE	−0.00288681	0.0431885	−0.0668	0.9468
T23_TH_LE	0.000439245	0.0420992	0.0104	0.9917
T25_AEP_LE	0.138295	0.047529	2.9097	0.0039***
T35_GYO_LE	−0.116484	0.0924459	−1.2600	0.2086
T9_IFK_PBV	1.5376	0.907534	1.6943	0.0913*
T11_SFK				
Intercept	−2.01629	0.701631	−2.8737	0.0043***
T11_SFK_LEV	0.0536782	0.105787	0.5074	0.6122
T11_SFK_return	0.00283022	0.0373274	0.0758	0.9396
RE Sector	0.0651081	0.0314245	2.0719	0.0391**
DEBT/GDP	−0.052186	0.0595903	−0.8757	0.3819
T9_IFK_LE	−0.0154789	0.0455198	−0.3400	0.7341
T10_RG_LE	−0.650468	0.0719364	−9.0423	<0.0001***
T20_OYO_LE	0.000736354	0.0729096	0.0101	0.9919
T26_CF_LE	−0.100347	0.0515906	−1.9451	0.0527*
T27_GG_LE	−0.161016	0.130717	−1.2318	0.2190
T32_AMK_LE	−0.194483	0.130957	−1.4851	0.1386
T34_MZH_LE	−0.0828524	0.114803	−0.7217	0.4710
T12_VFK				
Intercept	−0.736132	2.09618	−0.3512	0.7257
T12_VFK_MM	−0.759891	1.35772	−0.5597	0.5761
T12_VFK_return	0.052711	0.0621364	0.8483	0.3969
XU100 Index	0.0621858	0.0460421	1.3506	0.1778
IVOL	−0.00411381	0.0465688	−0.0883	0.9297
T1_GF_LE	−0.159297	0.0884698	−1.8006	0.0728*
T5_GYH_LE	−0.0163258	0.0473655	−0.3447	0.7306
T6_GY_LE	−0.104555	0.104054	−1.0048	0.3158
T8_GEDY_LE	−0.116109	0.127956	−0.9074	0.3649
T11_SFK_LE	−0.629742	0.127739	−4.9299	<0.0001***
T18_FSY_LE	−0.105646	0.048617	−2.1730	0.0306**
T19_GEDG_LE	−0.183785	0.108528	−1.6934	0.0914*
T20_OYO_LE	−0.108551	0.0642434	−1.6897	0.0921*
T22_IYM_LE	−0.0366774	0.0955022	−0.3840	0.7012
T27_GG_LE	−0.0389995	0.347422	−0.1123	0.9107
T35_GYO_LE	−0.207766	0.101625	−2.0444	0.0418**
T13_TH				
Intercept	−4.02612	0.315367	−12.7665	<0.0001***
T13_TH_return	0.132417	0.0558337	2.3716	0.0183**
CDS	0.0300343	0.0387105	0.7759	0.4384
T2_FF_LE	0.293226	0.186077	1.5758	0.1161
T11_SFK_LE	−0.49499	0.20838	−2.3754	0.0182**
T12_VFK_LE	−0.838378	0.0101134	−82.8975	<0.0001***
T17_AYH_LE	0.0273882	0.129904	0.2108	0.8332
T21_AP_LE	0.0571895	0.155397	0.3680	0.7131
T28_GYM_LE	−0.0800855	0.068924	−1.1619	0.2462
T29_MG_LE	−0.115687	0.0692033	−1.6717	0.0956*
T34_MZH_LE	0.18653	0.226082	0.8251	0.4100
T35_GYO_LE	0.354711	0.173359	2.0461	0.0416**

T14_VMK				
Intercept	−8.67744	5.75045	−1.5090	0.1323
T14_VMK_return	0.00393131	0.0350148	0.1123	0.9107
Banks Sector	0.0906493	0.0387675	2.3383	0.0200**
IVOL	0.0873957	0.0745201	1.1728	0.2418
CDS	−0.0267963	0.0264513	−1.0130	0.3118
T13_TH_LE	−0.964606	0.0212392	−45.4164	<0.0001***
T18_FSY_LE	−0.194755	0.13021	−1.4957	0.1358
T20_OYO_LE	−0.0361368	0.0628511	−0.5750	0.5657
T14_VMK_PBV	4.96565	5.56627	0.8921	0.3730
T15_KYH				
Intercept	−4.60172	13.2845	−0.3464	0.7293
T15_KYH_SIZE	0.270793	3.44011	0.0787	0.9373
T15_KYH_return	−0.00900895	0.0486387	−0.1852	0.8532
XU100 Index	0.105567	0.0786895	1.3416	0.1808
IVOL	0.0099651	0.0719403	0.1385	0.8899
TRLIBOR	0.00952471	0.0564341	0.1688	0.8661
T1_GF_LE	0.0442558	0.144496	0.3063	0.7596
T9_IFK_LE	0.0841099	0.120969	0.6953	0.4874
T12_VFK_LE	−0.0602718	0.0479161	−1.2579	0.2094
T14_VMK_LE	−0.769902	0.060157	−12.7982	<0.0001***
T23_TH_LE	−0.0774216	0.143232	−0.5405	0.5892
T30_IY_LE	−0.190317	0.110884	−1.7164	0.0871*
T16_MG				
Intercept	−6.96846	2.33022	−2.9905	0.0030***
T16_MG_SIZE	1.52483	1.2759	1.1951	0.2330
T16_MG_LEV	−5.5131	4.31911	−1.2764	0.2028
Banks Sector	−0.0396298	0.0809771	−0.4894	0.6249
DEBT/GDP	−0.1313	0.164196	−0.7997	0.4246
IVOL	0.19179	0.107125	1.7903	0.0745*
T16_MG_return	0.0756038	0.0847383	0.8922	0.3730
T1_GF_LE	0.283956	0.241377	1.1764	0.2404
T3_AMY_LE	0.0598432	0.0644536	0.9285	0.3540
T4_GEND_LE	−0.0253522	0.0413374	−0.6133	0.5402
T7_EY_LE	−0.590925	0.490768	−1.2041	0.2296
T11_SFK_LE	0.30076	0.560212	0.5369	0.5918
T12_VFK_LE	−0.0500411	0.0910155	−0.5498	0.5829
T13_TH_LE	0.0431721	0.535977	0.0805	0.9359
T14_VMK_LE	−0.0335733	0.168393	−0.1994	0.8421
T15_KYH_LE	−0.852761	0.141908	−6.0092	<0.0001***
T17_AYH_LE	0.150138	0.286328	0.5244	0.6004
T18_FSY_LE	−0.0482635	0.258072	−0.1870	0.8518
T19_GEDG_LE	−0.0552582	0.254245	−0.2173	0.8281
T20_OYO_LE	−0.067348	0.163074	−0.4130	0.6799
T22_IYM_LE	0.0146563	0.351687	0.0417	0.9668
T24_EY_LE	−0.442311	0.266178	−1.6617	0.0977*
T26_CF_LE	−0.000388938	0.238944	−0.0016	0.9987
T29_MG_LE	−0.146116	0.196693	−0.7429	0.4582
T30_IY_LE	0.203764	0.182977	1.1136	0.2664
T32_AMK_LE	−0.311096	0.250691	−1.2410	0.2156
T35_GYO_LE	0.159645	0.241276	0.6617	0.5087
T39_AB_LE	−30.2088	25.4164	−1.1886	0.2356
T17_AYH				
Intercept	−3.95399	0.324946	−12.1681	<0.0001***
T17_AYH_LEV	−0.0315065	0.024045	−1.3103	0.1911
T17_AYH_PBV	0.660691	0.716366	0.9223	0.3571
T17_AYH_return	0.105636	0.0466133	2.2662	0.0242**
CDS	0.00321101	0.0186003	0.1726	0.8631
TRLIBOR	−0.00386968	0.042394	−0.0913	0.9273

T2_FF_LE	0.0268773	0.029259	0.9186	0.3591
T4_GEND_LE	0.00583062	0.0448126	0.1301	0.8966
T12_VFK_LE	−0.0214953	0.0263127	−0.8169	0.4146
T13_TH_LE	−0.0407799	0.0331659	−1.2296	0.2198
T15_KYH_LE	0.0317075	0.113673	0.2789	0.7805
T16_MG_LE	−0.576998	0.0444297	−12.9868	<0.0001***
T18_FSY_LE	0.411356	0.117652	3.4964	0.0005***
T21_AP_LE	−0.15558	0.153716	−1.0121	0.3123
T22_IYM_LE	0.00722979	0.11863	0.0609	0.9514
T27_GG_LE	0.0604205	0.334972	0.1804	0.8570
T33_ATAG_LE	0.117908	0.0574417	2.0527	0.0410**
T34_MZH_LE	−0.129732	0.190543	−0.6809	0.4965
T18_FSY				
Intercept	−3.3948	0.752011	−4.5143	<0.0001***
T18_FSY_return	0.0117892	0.0400659	0.2942	0.7688
XU100 Index	−0.107153	0.0495281	−2.1635	0.0313**
RE Sector	0.0952877	0.0474108	2.0098	0.0454**
IVOL	0.055229	0.0294883	1.8729	0.0621*
CDS	−0.045616	0.0191869	−2.3775	0.0181**
T1_GF_LE	−0.083686	0.108322	−0.7726	0.4404
T6_GY_LE	0.0140469	0.203528	0.0690	0.9450
T8_GEDY_LE	0.0318039	0.309722	0.1027	0.9183
T9_IFK_LE	−0.0382712	0.0688325	−0.5560	0.5786
T17_AYH_LE	−0.796402	0.0494893	−16.0924	<0.0001***
T20_OYO_LE	−0.026856	0.10204	−0.2632	0.7926
T24_EY_LE	0.0960137	0.117747	0.8154	0.4155
T28_GYM_LE	−0.0124563	0.0632793	−0.1968	0.8441
T33_ATAG_LE	−0.0468355	0.0514439	−0.9104	0.3633
T19_GEDG				
Intercept	−1.26192	0.22401	−5.6333	<0.0001***
T19_GEDG_PBV	0.2383	0.206551	1.1537	0.2495
T19_GEDG_return	0.0619283	0.0333573	1.8565	0.0644*
T3_AMY_LE	0.0835692	0.0404591	2.0655	0.039**
T4_GEND_LE	0.0123242	0.0226278	0.5446	0.5864
T7_EY_LE	−0.234786	0.0762017	−3.0811	0.0023***
T8_GEDY_LE	−0.103066	0.0343195	−3.0031	0.0029***
T9_IFK_LE	0.083316	0.0389043	2.1416	0.0330**
T12_VFK_LE	−0.0214917	0.0208802	−1.0293	0.3042
T15_KYH_LE	0.000210687	0.0113326	0.0186	0.9852
T18_FSY_LE	−0.857963	0.0224923	−38.1447	<0.0001***
T20_OYO				
Intercept	−1.99065	0.179027	−11.1193	<0.0001***
T38_TK_LE	−16.368	26.0958	−0.6272	0.5310
T23_TH_LE	−0.175181	0.0490891	−3.5686	0.0004***
T21_AP_LE	−0.0734278	0.166279	−0.4416	0.6591
T19_GEDG_LE	−0.822681	0.0655533	−12.5498	<0.0001***
T8_GEDY_LE	0.127648	0.100062	1.2757	0.2030
T20_OYO_return	0.135521	0.0257233	5.2684	<0.0001***
T21_AP				
Intercept	11.3729	7.72352	1.4725	0.1420
T21_AP_return	0.0984201	0.0409891	2.4011	0.0170**
T21_AP_SIZE	−1.94007	1.2235	−1.5857	0.1139
T21_AP_MM	−5.10282	39.5724	−0.1289	0.8975
XU100 Index	0.146842	0.0784675	1.8714	0.0623*
IVOL	−0.207254	0.0883021	−2.3471	0.0196**
CDS	−0.00479079	0.0265059	−0.1807	0.8567
T1_GF_LE	−0.097867	0.246257	−0.3974	0.6914
T2_FF_LE	−0.0296463	0.120345	−0.2463	0.8056
T4_GEND_LE	0.0513871	0.0164245	3.1287	0.0019***

T6_GY_LE	−0.196169	0.197682	−0.9923	0.3219
T9_IFK_LE	0.0525132	0.147563	0.3559	0.7222
T12_VFK_LE	0.0350214	0.0602054	0.5817	0.5612
T14_VMK_LE	−0.14985	0.086279	−1.7368	0.0835*
T15_KYH_LE	−0.112408	0.0517537	−2.1720	0.0307**
T20_OYO_LE	−0.748816	0.0407065	−18.3955	<0.0001***
T22_IYM_LE	0.00144864	0.0984003	0.0147	0.9883
T23_TH_LE	−0.00102335	0.0859661	−0.0119	0.9905
T25_AEP_LE	0.189891	0.0827001	2.2961	0.0224**
T26_CF_LE	0.0116537	0.109915	0.1060	0.9156
T27_GG_LE	−0.0460641	0.146117	−0.3153	0.7528
T30_IY_LE	−0.189392	0.0532679	−3.5555	0.0004***
T31_AG_LE	−0.0670974	0.0205968	−3.2577	0.0013***
T33_ATAG_LE	−0.115474	0.0382546	−3.0186	0.0028***
T22_IYM				
Intercept	4.61588	4.21638	1.0947	0.2745
T22_IYM_DE	−0.0754305	0.0508785	−1.4826	0.1393
T22_IYM_return	0.12552	0.078469	1.5996	0.1108
Banks Sector	0.00889163	0.0313893	0.2833	0.7772
RE Sector	0.0264183	0.0350489	0.7538	0.4516
IVOL	−0.00896854	0.0286734	−0.3128	0.7547
T4_GEND_LE	0.0357235	0.0205644	1.7372	0.0834*
T8_GEDY_LE	−0.170565	0.105908	−1.6105	0.1084
T13_TH_LE	0.0170102	0.101764	0.1672	0.8674
T15_KYH_LE	0.035844	0.0199461	1.7970	0.0734*
T19_GEDG_LE	0.0320466	0.0604468	0.5302	0.5964
T21_AP_LE	−0.750235	0.244784	−3.0649	0.0024***
T23_TH_LE	0.00732051	0.0907712	0.0806	0.9358
T25_AEP_LE	0.0531887	0.136166	0.3906	0.6964
T26_CF_LE	0.0095004	0.0753351	0.1261	0.8997
T29_MG_LE	−0.0709769	0.0342978	−2.0694	0.0394**
T31_AG_LE	−0.0375897	0.0452943	−0.8299	0.4073
T23_TH				
Intercept	0.117198	1.33652	0.0877	0.9302
T23_TH_MM	−5.47973	4.24384	−1.2912	0.1976
T23_TH_return	0.190499	0.0611268	3.1165	0.0020***
XU100 Index	−0.0453431	0.0835163	−0.5429	0.5876
RE Sector	0.0258055	0.0774447	0.3332	0.7392
BUDGET/GDP	1.63921	5.00112	0.3278	0.7433
IVOL	−0.025062	0.0584465	−0.4288	0.6684
T5_GYH_LE	−0.139908	0.0821874	−1.7023	0.0897*
T8_GEDY_LE	−0.253704	0.253662	−1.0002	0.3180
T22_IYM_LE	−0.740556	0.0838179	−8.8353	<0.0001***
T29_MG_LE	−0.0104078	0.0984906	−0.1057	0.9159
T36_HOS_LE	−0.054758	0.0637367	−0.8591	0.3910
T24_EY				
Intercept	17.0285	14.0659	1.2106	0.2270
T24_EY_LEV	−17.6578	13.4219	−1.3156	0.1893
XU100 Index	0.137008	0.0454209	3.0164	0.0028***
RE Sector	0.0514783	0.0264117	1.9491	0.0522*
BUDGET/GDP	1.87839	1.7352	1.0825	0.2799
T24_EY_return	0.0506503	0.0311262	1.6273	0.1048
T1_GF_LE	−0.0655886	0.0660048	−0.9937	0.3212
T4_GEND_LE	−0.00315677	0.0286746	−0.1101	0.9124
T7_EY_LE	0.144123	0.229631	0.6276	0.5307
T8_GEDY_LE	−0.077869	0.199916	−0.3895	0.6972
T15_KYH_LE	0.0760173	0.028357	2.6807	0.0078***
T21_AP_LE	−0.115065	0.136676	−0.8419	0.4005
T22_IYM_LE	−0.0355058	0.0559657	−0.6344	0.5263

T23_TH_LE	−0.734486	0.116447	−6.3075	<0.0001***
T25_AEP_LE	0.00939861	0.0116878	0.8041	0.4220
T29_MG_LE	0.0864834	0.0302355	2.8603	0.0045***
T35_GYO_LE	−0.127478	0.169717	−0.7511	0.4532
T36_HOS_LE	−0.135261	0.0481584	−2.8087	0.0053***
T25_AEP				
Intercept	−2.06175	0.177193	−11.6356	<0.0001***
T25_AEP_return	0.0689939	0.0595527	1.1585	0.2476
XU100 Index	0.10415	0.191972	0.5425	0.5879
Banks Sector	0.0125271	0.14533	0.0862	0.9314
RE Sector	−0.0634262	0.0943816	−0.6720	0.5021
DEBT/GDP	0.0864674	0.0990108	0.8733	0.3832
CDS	0.0306834	0.0303563	1.0108	0.3130
TRLIBOR	−0.100377	0.0370631	−2.7083	0.0072***
T1_GF_LE	−0.029362	0.122025	−0.2406	0.8100
T5_GYH_LE	−0.000747289	0.102854	−0.0073	0.9942
T8_GEDY_LE	0.0932844	0.237379	0.3930	0.6946
T9_IFK_LE	−0.146438	0.106731	−1.3720	0.1711
T20_OYO_LE	0.00770129	0.0322978	0.2384	0.8117
T21_AP_LE	−0.0043977	0.100497	−0.0438	0.9651
T22_IYM_LE	−0.0181844	0.138655	−0.1311	0.8957
T23_TH_LE	−0.262634	0.0915891	−2.8675	0.0044***
T24_EY_LE	−0.677983	0.0347911	−19.4873	<0.0001***
T35_GYO_LE	0.0750103	0.144955	0.5175	0.6052
T39_AB_LE	−2.98945	5.73071	−0.5217	0.6023
T26_CF				
Intercept	−1.14825	0.541339	−2.1211	0.0347**
T26_CF_return	0.108591	0.0637253	1.7040	0.0894*
Banks Sector	0.0102232	0.0441498	0.2316	0.8170
T26_CF_MM	−0.365653	0.711842	−0.5137	0.6079
CDS	−0.0280522	0.0195263	−1.4366	0.1519
T5_GYH_LE	0.0177665	0.0651364	0.2728	0.7852
T21_AP_LE	−0.0602418	0.112787	−0.5341	0.5937
T25_AEP_LE	−0.761894	0.110631	−6.8868	<0.0001***
T28_GYM_LE	−0.0860277	0.0907694	−0.9478	0.3440
T32_AMK_LE	−0.0176417	0.192425	−0.0917	0.9270
T35_GYO_LE	−0.0556631	0.0873495	−0.6372	0.5244
T27_GG				
Intercept	−2.09412	0.234405	−8.9338	<0.0001***
T27_GG_MM	0.278372	0.373073	0.7462	0.4562
T27_GG_return	0.0283786	0.0596555	0.4757	0.6346
CDS	−0.00126248	0.0136415	−0.0925	0.9263
TRLIBOR	−0.0861096	0.0436601	−1.9723	0.0495**
T1_GF_LE	−0.0332711	0.0850834	−0.3910	0.6961
T8_GEDY_LE	−0.0847042	0.140433	−0.6032	0.5469
T12_VFK_LE	0.0228362	0.106339	0.2147	0.8301
T16_MG_LE	0.0325339	0.117529	0.2768	0.7821
T19_GEDG_LE	−0.126747	0.0866272	−1.4631	0.1445
T20_OYO_LE	0.00570804	0.0603774	0.0945	0.9247
T22_IYM_LE	0.0138454	0.162238	0.0853	0.9320
T23_TH_LE	−0.0531979	0.079672	−0.6677	0.5048
T24_EY_LE	−0.125118	0.142863	−0.8758	0.3819
T25_AEP_LE	0.0312251	0.0894883	0.3489	0.7274
T26_CF_LE	−0.655242	0.185572	−3.5309	0.0005***
T32_AMK_LE	−0.123151	0.180526	−0.6822	0.4957
T35_GYO_LE	0.0139577	0.119627	0.1167	0.9072
T28_GYM				
Intercept	−0.256951	0.363271	−0.7073	0.4799
T28_GYM_LEV	−0.10087	0.0472852	−2.1332	0.0337**

T28_GYM_return	0.0594876	0.0409834	1.4515	0.1477
BUDGET/GDP	0.92913	1.66844	0.5569	0.5780
DEBT/GDP	0.0470197	0.0259413	1.8125	0.0709*
CDS	−0.0121684	0.00776648	−1.5668	0.1182
T2_FF_LE	−0.00130536	0.061864	−0.0211	0.9832
T3_AMY_LE	−0.0426605	0.0704572	−0.6055	0.5453
T13_TH_LE	−0.00195796	0.0129556	−0.1511	0.8800
T14_VMK_LE	0.00591228	0.0195217	0.3029	0.7622
T19_GEDG_LE	0.0127467	0.0197369	0.6458	0.5189
T20_OYO_LE	0.0203391	0.0140239	1.4503	0.1480
T24_EY_LE	0.0165047	0.0363096	0.4546	0.6498
T27_GG_LE	−0.84518	0.0718349	−11.7656	<0.0001***
T29_MG				
Intercept	−6.60178	4.91866	−1.3422	0.1806
T29_MG_SIZE	0.832666	0.90922	0.9158	0.3605
T29_MG_return	0.179627	0.0504663	3.5593	0.0004***
Banks Sector	0.039938	0.0267771	1.4915	0.1369
BUDGET/GDP	−1.44365	3.50399	−0.4120	0.6806
DEBT/GDP	−0.219777	0.0736815	−2.9828	0.0031***
TRLIBOR	−0.0823629	0.0332216	−2.4792	0.0137**
T1_GF_LE	−0.168696	0.0963458	−1.7509	0.0810*
T4_GEND_LE	0.0341427	0.0349978	0.9756	0.3301
T8_GEDY_LE	0.00594566	0.135168	0.0440	0.9649
T9_IFK_LE	0.0249048	0.0697202	0.3572	0.7212
T14_VMK_LE	−0.0192363	0.0374088	−0.5142	0.6075
T15_KYH_LE	−0.0562828	0.0609448	−0.9235	0.3565
T19_GEDG_LE	0.0932621	0.120852	0.7717	0.4409
T20_OYO_LE	0.0126292	0.0492765	0.2563	0.7979
T21_AP_LE	−0.0551196	0.100905	−0.5463	0.5853
T22_IYM_LE	0.0245402	0.0880024	0.2789	0.7806
T23_TH_LE	−0.0173803	0.0783769	−0.2218	0.8247
T27_GG_LE	−0.119574	0.236244	−0.5061	0.6131
T28_GYM_LE	−0.878883	0.0364561	−24.1080	<0.0001***
T30_IY_LE	−0.0262225	0.104375	−0.2512	0.8018
T34_MZH_LE	0.108578	0.181537	0.5981	0.5502
T35_GYO_LE	0.0435266	0.154252	0.2822	0.7780
T39_AB_LE	−22.4245	11.889	−1.8862	0.0603*
T30_IY				
Intercept	−2.62103	0.425306	−6.1627	<0.0001***
T30_IY_LEV	0.689088	0.298359	2.3096	0.0216**
T30_IY_return	0.050952	0.0405665	1.2560	0.2101
XU100 Index	0.00109522	0.0414764	0.0264	0.9790
BUDGET/GDP	0.0912431	3.58853	0.0254	0.9797
TRLIBOR	0.0619996	0.026066	2.3786	0.0180**
T1_GF_LE	−0.199112	0.0751471	−2.6496	0.0085***
T4_GEND_LE	−0.0156054	0.00602131	−2.5917	0.0100**
T6_GY_LE	0.0371437	0.0896418	0.4144	0.6789
T10_RG_LE	0.0103172	0.164653	0.0627	0.9501
T13_TH_LE	0.0300765	0.0778853	0.3862	0.6997
T14_VMK_LE	−0.0438324	0.0190208	−2.3044	0.0219**
T17_AYH_LE	−0.0288137	0.113794	−0.2532	0.8003
T19_GEDG_LE	−0.0419505	0.0540733	−0.7758	0.4385
T24_EY_LE	−0.047018	0.0769273	−0.6112	0.5415
T26_CF_LE	−0.0695265	0.0832329	−0.8353	0.4042
T27_GG_LE	0.171602	0.184558	0.9298	0.3532
T28_GYM_LE	−0.0108596	0.0467276	−0.2324	0.8164
T29_MG_LE	−0.905751	0.115923	−7.8134	<0.0001***
T31_AG_LE	0.00232829	0.0127388	0.1828	0.8551
T34_MZH_LE	0.11607	0.186139	0.6236	0.5334

T31_AG				
Intercept	−1.69722	0.735992	−2.3060	0.0218**
T31_AG_PBV	−0.551654	0.030041	−18.3634	<0.0001***
T31_AG_return	0.128947	0.0225712	5.7129	<0.0001***
Budget DEBT/GDP	−0.0264427	0.0276158	−0.9575	0.3391
IVOL	0.0578632	0.0256921	2.2522	0.0250**
T30_IY_LE	−0.798657	0.0553336	−14.4335	<0.0001***
T32_AMK				
Intercept	20.7558	8.05136	2.5779	0.0104**
T32_AMK_SIZE	−4.67891	1.57577	−2.9693	0.0032***
T32_AMK_PBV	−0.487972	0.371051	−1.3151	0.1895
T32_AMK_return	0.111042	0.0174476	6.3643	<0.0001***
BUDGET/GDP	7.51517	7.20488	1.0431	0.2978
T3_AMY_LE	−0.161058	0.133579	−1.2057	0.2289
T7_EY_LE	−0.247787	0.135424	−1.8297	0.0683*
T13_TH_LE	−0.0899986	0.0452101	−1.9907	0.0474**
T15_KYH_LE	−0.0270966	0.150847	−0.1796	0.8576
T21_AP_LE	0.6975	0.144159	4.8384	<0.0001***
T22_IYM_LE	−0.529744	0.199223	−2.6591	0.0083***
T25_AEP_LE	0.186363	0.0454253	4.1026	<0.0001
T27_GG_LE	−0.30308	0.500849	−0.6051	0.5456
T31_AG_LE	−0.770313	0.0449319	−17.1440	<0.0001***
T36_HOS_LE	0.071033	0.0596852	1.1901	0.2349
T33_ATAG				
Intercept	−1.65153	0.115085	−14.3505	<0.0001***
T33_ATAG_return	0.0607699	0.0328098	1.8522	0.0650*
DEBT/GDP	0.0299245	0.0572547	0.5227	0.6016
T20_OYO_LE	−0.0127896	0.0367584	−0.3479	0.7281
T23_TH_LE	0.136526	0.0942591	1.4484	0.1485
T31_AG_LE	0.00218668	0.0204927	0.1067	0.9151
T32_AMK_LE	−0.887011	0.0466959	−18.9955	<0.0001***
T34_MZH				
Intercept	−3.43441	0.984668	−3.4879	0.0006***
T34_MZH_LEV	−0.785199	0.250561	−3.1338	0.0019***
T34_MZH_PBV	3.44332	1.94879	1.7669	0.0783*
T34_MZH_return	0.075175	0.0462665	1.6248	0.1053
XU100 Index	0.0209964	0.0748382	0.2806	0.7792
RE Sector	0.032324	0.0615168	0.5254	0.5997
DEBT/GDP	−0.0311574	0.0816305	−0.3817	0.7030
IVOL	−0.0135007	0.0327832	−0.4118	0.6808
TRLIBOR	0.0529608	0.0361816	1.4638	0.1443
T1_GF_LE	−0.0968967	0.0245587	−3.9455	<0.0001***
T4_GEND_LE	0.0278929	0.00790798	3.5272	0.0005***
T8_GEDY_LE	−0.0465992	0.187689	−0.2483	0.8041
T12_VFK_LE	0.00472961	0.0735352	0.0643	0.9488
T20_OYO_LE	−0.0415605	0.0292286	−1.4219	0.1561
T21_AP_LE	−0.0662756	0.137726	−0.4812	0.6307
T29_MG_LE	0.0480515	0.0619865	0.7752	0.4388
T33_ATAG_LE	−0.674097	0.129598	−5.2014	<0.0001***
T35_GYO				
Intercept	24.6581	14.0258	1.7580	0.0798*
T35_GYO_LEV	−22.8905	13.3691	−1.7122	0.0879*
T35_GYO_PBV	−4.01975	2.08419	−1.9287	0.0547*
T35_GYO_return	0.0469312	0.0787565	0.5959	0.5517
XU100 Index	0.086248	0.0856239	1.0073	0.3146
RE Sector	0.0159171	0.0560909	0.2838	0.7768
BUDGET/GDP	−2.93427	3.64211	−0.8057	0.4211
DEBT/GDP	−0.000303167	0.116886	−0.0026	0.9979
IVOL	−0.030019	0.0456965	−0.6569	0.5117

CDS	−0.00110318	0.0181501	−0.0608	0.9516
T6_GY_LE	−0.0662785	0.108272	−0.6121	0.5409
T20_OYO_LE	−0.0125901	0.0489467	−0.2572	0.7972
T23_TH_LE	0.0124714	0.075193	0.1659	0.8684
T28_GYM_LE	−0.074088	0.0438639	−1.6890	0.0923*
T34_MZH_LE	−0.771385	0.0810484	−9.5176	<0.0001***
T36_HOS_LE	−0.00767634	0.0893884	−0.0859	0.9316
T36_HOS				
Intercept	−2.01534	0.212219	−9.4965	<0.0001***
T36_HOS_return	0.131431	0.077809	1.6892	0.0922*
XU100 Index	0.0999939	0.0566213	1.7660	0.0784*
T3_AMY_LE	−0.0401221	0.054973	−0.7299	0.4660
T20_OYO_LE	−0.00503601	0.0339774	−0.1482	0.8823
T29_MG_LE	−0.035665	0.0563958	−0.6324	0.5276
T34_MZH_LE	−0.0685913	0.0979844	−0.7000	0.4844
T35_GYO_LE	−0.542089	0.0559412	−9.6903	<0.0001***
T38_TK				
Intercept	−3.32125	3.93453	−0.8441	0.3993
T38_TK_MM	4.93185	1.31262	3.7573	0.0002***
T38_TK_DE	0.0170616	0.0473239	0.3605	0.7187
T38_TK_return	0.0358641	0.0650343	0.5515	0.5817
RE Sector	0.00551886	0.0403195	0.1369	0.8912
DEBT/GDP	0.0438727	0.0689557	0.6362	0.5251
T1_GF_LE	−0.110585	0.108673	−1.0176	0.3097
T5_GYH_LE	0.00810805	0.0531186	0.1526	0.8788
T7_EY_LE	−0.324862	0.12814	−2.5352	0.0117**
T14_VMK_LE	−0.0298365	0.0582876	−0.5119	0.6091
T31_AG_LE	−0.031906	0.0145343	−2.1952	0.0289**
T36_HOS_LE	−0.873927	0.148843	−5.8715	<0.0001***
T39_AB_LE	−6.63089	6.41009	−1.0344	0.3018

Abu Dhabi

	Value	Std. Error	*t*-ratio	*P*-value
(Intercept)	-1.23881	0.4092	-3.02739	0.00268
A1_ADC_log	-0.19661	0.06496	-3.02671	0.00269
AD_Banks_Index	0.12832	0.05686	2.257	0.02472
A2_ADI_LE	0.12801	0.22586	0.56679	0.57128
A5_OB_LE	-0.93478	0.19808	-4.71923	0
A9_UOB_LE	-0.06205	0.20095	-0.30879	0.75769
A14_FHP_LE	0.05498	0.07654	0.71831	0.47312
A20_ADO_LE	-0.4493	0.14464	-3.10636	0.00207
A22_AKI_LE	0.16334	0.07191	2.27145	0.02383
A30_MT_LE	-0.31974	0.0658	-4.85904	0
A31_INSUH_LE	-0.01223	0.23879	-0.05123	0.95918
3				
(Intercept)	-2.30002	1.56195	-1.47253	0.14191
A3_PBV	-0.0222	1.83333	-0.01211	0.99035
ADSMI_Index	-0.13586	0.08264	-1.64396	0.10121
A7_OBR_LE	-0.08613	0.1559	-0.55248	0.58102
A9_UOB_LE	0.06816	0.20492	0.33263	0.73964

A30_MT_LE	-0.17807	0.08827	-2.01743	0.04452
5				
(Intercept)	-1.24495	0.77628	-1.60374	0.10983
A5_PBV	-0.15038	0.63611	-0.2364	0.81329
A5_OB_log	-0.11492	0.09856	-1.16606	0.24452
oil	0.05007	0.02513	1.99258	0.04722
AD_Banks_Index	0.07844	0.06882	1.13989	0.25525
A1_ADC_LE	-0.21189	0.0829	-2.55604	0.01108
A2_ADI_LE	0.06732	0.06739	0.99891	0.31865
A8_SI_LE	-0.16213	0.27103	-0.59819	0.55017
A9_UOB_LE	-0.0668	0.18999	-0.3516	0.72539
A18_ABO_LE	0.15938	0.14944	1.06647	0.28708
A19_EI_LE	0.15295	0.24765	0.61761	0.53731
A22_AKI_LE	0.15387	0.09456	1.6273	0.10473
A26_ADT_LE	-0.01011	0.05494	-0.18401	0.85413
A30_MT_LE	-0.13038	0.08533	-1.52799	0.12758
A31_INSUH_LE	-0.0741	0.08585	-0.86306	0.3888
6				
(Intercept)	-4.55187	1.51605	-3.00245	0.0029
A6_OBF_log	-0.33467	0.15351	-2.18009	0.03001
A14_FHP_LE	-1.09522	0.55036	-1.99	0.04747
A29_RASK_LE	2.15314	4.00012	0.53827	0.59078
7				
(Intercept)	-1.11576	0.22136	-5.04048	0
A7_OBR_log	-0.26484	0.08314	-3.18559	0.0016
ADSMI_Index	0.08335	0.07214	1.15542	0.24883
A1_ADC_LE	0.14562	0.12886	1.13007	0.25934
A2_ADI_LE	-0.8695	0.24107	-3.60687	0.00036
A3_BOS_LE	-0.51834	0.19363	-2.67701	0.00783
A4_CBI_LE	-0.73731	0.30874	-2.38814	0.01755
A8_SI_LE	-0.48796	0.17078	-2.8572	0.00457
A9_UOB_LE	0.08474	0.12638	0.67055	0.50302
A30_MT_LE	0.21517	0.10841	1.98477	0.04807
8				
(Intercept)	-1.32822	0.25238	-5.26272	0
A5_OB_LE	-0.02585	0.16856	-0.15334	0.87823
A7_OBR_LE	-0.47906	0.10283	-4.65852	0
A9_UOB_LE	-0.38806	0.50923	-0.76206	0.44661
A30_MT_LE	-0.19499	0.05959	-3.27226	0.00119
9				
(Intercept)	-1.68977	0.34265	-4.93148	0
A9_UOB_log	-0.30169	0.08857	-3.4062	0.00075

oil	0.07249	0.03759	1.92867	0.05472
ADSMI_Index	0.02391	0.08687	0.27527	0.7833
A1_ADC_LE	-0.54673	0.18259	-2.99434	0.00298
A2_ADI_LE	-0.10237	0.17931	-0.57088	0.56851
A3_BOS_LE	0.0635	0.11468	0.55375	0.58017
A5_OB_LE	0.02147	0.15448	0.13901	0.88953
A8_SI_LE	-0.6907	0.18443	-3.74509	0.00022
A13_IBP_LE	-0.24844	0.17076	-1.45491	0.14675
A14_FHP_LE	0.0644	0.09806	0.6568	0.51181
A17_AAA_LE	0.39071	0.12611	3.09811	0.00213
A30_MT_LE	-0.01297	0.05644	-0.22987	0.81835
A31_INSUH_LE	0.41261	0.15431	2.67391	0.00791
13				
(Intercept)	3.87025	3.1383	1.23323	0.21848
A13_MM	103.9972	76.82727	1.35365	0.1769
A13_PBV	-5.24883	1.91396	-2.74239	0.00648
A13_IBP_log	-0.08253	0.10405	-0.79323	0.42829
USDAED_Implied_Volatility	1.20718	5.72736	0.21078	0.83321
ABUD_CDS_USD_5Y	-2.88853	1.48798	-1.94124	0.05319
AD_Banks_Index	0.07409	0.1457	0.50854	0.61146
AD_RE_Index	0.07259	0.05539	1.31058	0.19103
A2_ADI_LE	-0.15493	0.54358	-0.28502	0.77583
A4_CBI_LE	-0.47451	0.14057	-3.37564	0.00084
A5_OB_LE	0.50237	0.21763	2.30838	0.02168
A7_OBR_LE	0.20257	0.36833	0.54998	0.58275
A8_SI_LE	-0.32086	0.24864	-1.29047	0.19791
A9_UOB_LE	-0.21593	0.28344	-0.76182	0.44678
A16_WT_LE	0.00709	0.07849	0.0903	0.92811
A17_AAA_LE	-0.11955	0.3056	-0.39122	0.69592
A20_ADO_LE	0.36476	0.19747	1.84712	0.06574
A23_AW_LE	0.54331	3.90207	0.13924	0.88936
A24_UnionI_LE	0.19506	0.24852	0.78489	0.43316
A27_SINSU_LE	1.79055	2.31643	0.77298	0.44016
A31_INSUH_LE	-0.02426	0.2711	-0.08948	0.92876
14				
(Intercept)	-4.01536	0.34213	-11.7365	0
A5_OB_LE	-0.90467	0.33089	-2.73406	0.00662
16				
(Intercept)	-4.2685	0.44561	-9.57894	0
A16_WT_log	-0.18173	0.13571	-1.33911	0.18153
ADSMI_Index	0.041	0.1938	0.21153	0.83261
A23_AW_LE	0.58418	0.04377	13.34696	0
A29_RASK_LE	-0.36175	0.34485	-1.04899	0.29501

A31_INSUH_LE	0.40767	0.48441	0.84158	0.40068
19				
(Intercept)	10.14801	4.09723	2.4768	0.01379
A19_PBV	-9.97914	3.97517	-2.51037	0.01257
A8_SI_LE	-0.41337	0.24859	-1.66284	0.09736
A11_UAB_LE	-0.31353	0.20096	-1.56015	0.11975
20				
(Intercept)	1.9831	2.02818	0.97777	0.32896
A20_PBV	-3.68627	1.49946	-2.4584	0.01451
ADSMI_Index	0.32611	0.16481	1.97872	0.04874
A1_ADC_LE	-0.53664	0.35577	-1.50837	0.13249
A24_UnionI_LE	-0.07348	0.24125	-0.30457	0.7609
23				
(Intercept)	0.04676	0.08895	0.52576	0.59944
A23_PBV	-0.3707	0.06737	-5.5023	0
A23_AW_log	0.06847	0.01339	5.11218	0
ABUD_CDS_USD_5Y	0.18186	0.07373	2.46651	0.0142
ADSMI_Index	0.01606	0.00462	3.47283	0.00059
A4_CBI_LE	-0.0107	1.59978	-0.00669	0.99467
A12_OBU_LE	0.00492	0.55021	0.00895	0.99287
A14_FHP_LE	0.01926	0.00617	3.11936	0.00199
A16_WT_LE	0.01362	0.01007	1.35243	0.17725
A31_INSUH_LE	0.03133	0.00679	4.61411	0.00001
27				
(Intercept)	-0.00523	0.00124	-4.21761	0.00003
A27_SINSU_log	1.00992	0.00861	117.2758	0
28				
(Intercept)	-161.637	126.6969	-1.27577	0.2031
A28_size	27.53071	21.33001	1.2907	0.19788
A28_LEV	3.79447	4.07494	0.93117	0.35257
A28_PBV	-0.02831	0.10818	-0.26166	0.79378
A28_ADINSU_log	0.61898	0.12786	4.84105	0
oil	0.00443	0.05013	0.08839	0.92963
AD_RE_Index	0.0028	0.02964	0.09463	0.92468
A1_ADC_LE	-0.48665	0.23364	-2.08288	0.03817
A2_ADI_LE	-0.13766	0.36306	-0.37916	0.70486
A3_BOS_LE	0.03373	0.19926	0.16925	0.86572
A4_CBI_LE	-0.09784	0.13326	-0.73421	0.46344
A5_OB_LE	-0.09976	0.2876	-0.34687	0.72895
A6_OBF_LE	0.06018	0.04894	1.22952	0.21991
A7_OBR_LE	0.28545	0.17232	1.65654	0.09874
A8_SI_LE	-0.58669	0.42157	-1.3917	0.16512
A9_UOB_LE	0.14616	0.43222	0.33816	0.73549

A12_OBU_LE	0.15992	0.10322	1.5493	0.12244
A13_IBP_LE	0.08234	0.12318	0.6685	0.50437
A14_FHP_LE	-0.23319	0.17096	-1.36399	0.17367
A16_WT_LE	0.14168	0.13837	1.0239	0.30677
A17_AAA_LE	-0.57121	0.10388	-5.49881	0
A18_ABO_LE	-0.39269	0.20556	-1.91032	0.05712
A19_EI_LE	0.29063	0.47394	0.61323	0.54023
A20_ADO_LE	0.15225	0.13917	1.09402	0.27489
A22_AKI_LE	-0.20977	0.12663	-1.65647	0.09875
A23_AW_LE	0.0847	1.26949	0.06672	0.94685
A24_UnionI_LE	0.05877	0.15674	0.37494	0.70799
A25_UI_LE	-55.1815	165.0455	-0.33434	0.73837
A26_ADT_LE	0.01064	0.08207	0.12968	0.89692
A27_SINSU_LE	-1.63056	2.61785	-0.62286	0.53388
A29_RASK_LE	0.26806	0.7755	0.34566	0.72986
A30_MT_LE	0.25716	0.14758	1.74248	0.08253
A31_INSUH_LE	-0.64352	0.53131	-1.21119	0.22685
30				
(Intercept)	0.98166	1.07203	0.9157	0.36057
A30_PBV	-1.02512	0.34166	-3.00041	0.00293
UAE_Interest_rate_swap	-0.35172	0.43394	-0.81054	0.41828
AD_Banks_Index	-0.00947	0.17532	-0.05402	0.95696
AD_RE_Index	0.05503	0.07747	0.71029	0.47809
A1_ADC_LE	-0.36973	0.32053	-1.15349	0.24964
A2_ADI_LE	-0.65832	1.02748	-0.64071	0.52221
A3_BOS_LE	-0.19749	0.32028	-0.61663	0.53796
A4_CBI_LE	-0.31054	0.21847	-1.42142	0.15625
A5_OB_LE	-0.05902	0.39878	-0.14799	0.88245
A8_SI_LE	-0.28847	0.52368	-0.55084	0.58216
A9_UOB_LE	-0.89282	0.74234	-1.20271	0.23005
A11_UAB_LE	-0.10282	0.23624	-0.43525	0.6637
A13_IBP_LE	-0.29599	0.18297	-1.61769	0.1068
A18_ABO_LE	-0.66834	0.53538	-1.24835	0.21289
A20_ADO_LE	0.47807	0.16091	2.971	0.00321
A29_RASK_LE	1.56173	3.08324	0.50652	0.61287

Indonesia				
	Value	Std. Error	*t*-ratio	*p*-value
1				
(Intercept)	-0.00545	0.13729	-0.03973	0.96834
I1_size	0.00105	0.01537	0.06855	0.94539
I1_DE	-0.00011	0.0004	-0.27349	0.78467

I1_BN_log	0.94564	0.05225	18.09969	0
INDON_CDS_5Y	-0.00129	0.00403	-0.31949	0.74958
JCI_VOL	0.00004	0.00031	0.12687	0.89913
I2_BON_LE	0.00253	0.01996	0.12697	0.89905
I4_PTB_LE	0.00299	0.00864	0.34556	0.72992
I5_BMI_LE	0.00269	0.013	0.207	0.83615
I13_WOO_LE	-0.00002	0.00037	-0.05494	0.95623
I15_BII_LE	0.00002	0.00051	0.03598	0.97133
I49_MNC_LE	0.00001	0.00021	0.04342	0.9654
I54_AD_LE	-0.00001	0.00058	-0.01658	0.98679
I57_WO_LE	-0.00001	0.00049	-0.02342	0.98133
I60_MM_LE	-0.00002	0.00214	-0.0079	0.9937
I64_CI_LE	0.00001	0.00032	0.02375	0.98107
I72_EVLE_LE	0.00006	0.00053	0.12196	0.90301
2				
(Intercept)	-0.00671	0.00098	-6.86296	0
I2_BON_log	0.9978	0.00269	371.4959	0
I5_BMI_LE	0.00464	0.00243	1.90903	0.05719
I13_WOO_LE	-0.00538	0.02957	-0.18196	0.85573
3				
(Intercept)	-2.10285	0.63343	-3.31977	0.00101
I10_BCA_LE	-1.23843	0.83066	-1.49089	0.13703
I12_BUKO_LE	0.28583	0.40772	0.70104	0.48382
I14_DAM_LE	0.08021	0.38401	0.20888	0.83468
I23_BAG_LE	-0.84944	0.54938	-1.54617	0.1231
I32_NEG_LE	-0.20968	0.57085	-0.36732	0.71364
I40_BHI_LE	0.98767	2.96001	0.33367	0.73886
I67_ONIX_LE	-4.29872	2.21001	-1.94511	0.05268
4				
(Intercept)	-0.04055	0.00506	-8.01497	0
I4_PTB_log	0.97676	0.00755	129.2993	0
I2_BON_LE	0.03271	0.01299	2.51765	0.01233
I5_BMI_LE	0.10333	0.02725	3.79159	0.00018
I6_BQI_LE	0.00099	0.00032	3.1359	0.00188
I21_EKON_LE	-0.00055	0.00081	-0.67186	0.50218
I59_LES_LE	0.00054	0.00166	0.32448	0.7458
I6_BQI				
(Intercept)	-1.09601	0.78096	-1.40341	0.16152
I6_BQI_log	-0.13382	0.11347	-1.17936	0.23918
I11_BUMI_LE	0.40624	0.42437	0.95729	0.33918
I24_VIC_LE	-1.23036	0.93084	-1.32177	0.18724

I31_OTIO_LE	0.52206	0.47237	1.10518	0.26995
I35_MITLE_LE	-0.99083	0.4285	-2.31229	0.02143
I37_PANI_LE	-1.17879	3.24064	-0.36375	0.7163
I44_SMM_LE	-1.55603	0.3289	-4.73108	0
7				
(Intercept)	-17.3649	29.33505	-0.59195	0.55436
I7_size	1.59325	2.59319	0.6144	0.53945
I7_PBV	-0.33111	0.80519	-0.41122	0.68123
I7_BM_log	-0.10696	0.10059	-1.06336	0.28853
JCI_INDEX	-0.10838	0.13925	-0.77834	0.43702
Indonesia_F_Index	0.04461	0.09697	0.46002	0.64586
I2_BON_LE	0.79182	0.85384	0.92736	0.35453
I3_BP_LE	-0.01862	0.09757	-0.19078	0.84883
I6_BQI_LE	0.17477	0.1793	0.97473	0.33053
I8_BLEI_LE	-0.1311	0.304	-0.43127	0.6666
I9_PBM_LE	-0.2916	0.20372	-1.43142	0.15342
I10_BCA_LE	-0.21759	0.35362	-0.61532	0.53884
I12_BUKO_LE	0.05313	0.17909	0.29668	0.76693
I13_WOO_LE	-0.1577	0.20202	-0.78065	0.43566
I14_DAM_LE	-0.08118	0.124	-0.65466	0.51322
I18_KENT_LE	-0.14992	0.10959	-1.36801	0.1724
I20_AGLE_LE	0.03398	0.16614	0.20454	0.83808
I22_TAB_LE	0.09447	0.21359	0.44232	0.6586
I32_NEG_LE	-0.64174	0.35669	-1.79914	0.07307
I35_MITLE_LE	-0.04284	0.28176	-0.15205	0.87926
I37_PANI_LE	-0.94896	0.6445	-1.4724	0.14203
I43_DE_LE	3.01305	3.73127	0.80751	0.42005
I46_PI_LE	-0.03856	0.23213	-0.16613	0.86817
I48_ATP_LE	0.01294	0.08047	0.16083	0.87234
I53_PTP_LE	-0.16342	0.24563	-0.66533	0.50638
I59_LES_LE	0.03312	0.22623	0.1464	0.88371
I61_LS_LE	0.12908	0.12344	1.04565	0.29662
I68_VELEO_LE	0.10082	0.12642	0.79745	0.42586
I69_CLIP_LE	-0.14971	0.16567	-0.90363	0.36696
I71_TABU_LE	-0.2189	0.14506	-1.50902	0.13241
8				
(Intercept)	-0.42169	0.66424	-0.63485	0.52602
I8_PBV	-0.12254	0.2631	-0.46576	0.64173
I8_BlogI_log	-0.17856	0.05493	-3.25069	0.00129
JCI_INDEX	0.02682	0.0684	0.39204	0.69531
I2_BON_LE	0.68268	0.6532	1.04513	0.29683

I7_BM_LE	-0.37227	0.2846	-1.30805	0.19189
I10_BCA_LE	-0.27353	0.27617	-0.99045	0.32278
I12_BUKO_LE	-0.14604	0.24377	-0.5991	0.54957
I14_DAM_LE	-0.11151	0.24715	-0.45117	0.6522
I15_BII_LE	-0.10459	0.18706	-0.55914	0.5765
I18_KENT_LE	-0.00603	0.11105	-0.05434	0.9567
I20_AGLE_LE	-0.01441	0.23588	-0.06108	0.95134
I23_BAG_LE	-0.19693	0.18667	-1.05497	0.29231
I27_PAN_LE	0.06036	0.14938	0.40407	0.68646
I31_OTIO_LE	0.14384	0.23788	0.60468	0.54586
I32_NEG_LE	-0.31824	0.28655	-1.11058	0.26766
I56_YS_LE	-0.0707	0.09939	-0.71134	0.47744
I61_LS_LE	-0.23003	0.16045	-1.43362	0.15275
I71_TABU_LE	-0.06785	0.16668	-0.40706	0.68426
I72_EVLE_LE	-0.03187	0.18857	-0.16899	0.86592
9				
(Intercept)	0.59163	1.8448	0.3207	0.74865
I9_PBV	-1.74875	0.78882	-2.21693	0.02736
I46_PI_LE	-0.4938	0.21857	-2.25926	0.02456
10				
(Intercept)	1.04587	1.97639	0.52918	0.5971
I10_PBV	-0.43125	0.55616	-0.77541	0.43875
I10_BCA_log	-0.13091	0.09271	-1.41206	0.15904
JCI_INDEX	0.02286	0.0637	0.35891	0.71993
I2_BON_LE	2.14834	1.29477	1.65925	0.09819
I3_BP_LE	-0.02832	0.17123	-0.16539	0.86876
I7_BM_LE	-0.33025	0.22811	-1.44781	0.14879
I8_BLEI_LE	-0.56387	0.26211	-2.15127	0.03231
I13_WOO_LE	-0.07906	0.08418	-0.93915	0.34846
I14_DAM_LE	-0.01639	0.09745	-0.16817	0.86657
I15_BII_LE	0.00101	0.19186	0.00526	0.99581
I17_PELE_LE	-0.12911	0.17023	-0.75844	0.44882
I20_AGLE_LE	0.06414	0.18768	0.34174	0.7328
I21_EKON_LE	0.01657	0.16892	0.09807	0.92194
I24_VIC_LE	-0.12995	0.1282	-1.01368	0.31161
I32_NEG_LE	-0.06059	0.25782	-0.23501	0.81438
I33_MEST_LE	0.23825	1.10394	0.21582	0.82929
I38_BAT_LE	-0.01725	0.25835	-0.06676	0.94682
I40_BHI_LE	0.16941	5.11954	0.03309	0.97363
I44_SMM_LE	-0.18908	0.20303	-0.93128	0.35251
I46_PI_LE	-0.03006	0.054	-0.55668	0.57819

I49_MNC_LE	-0.00894	0.07869	-0.11355	0.90967
I51_PAC_LE	-0.02686	0.18439	-0.14565	0.8843
I52_TS_LE	-0.13145	0.10744	-1.22345	0.22219
I56_YS_LE	0.06959	0.05453	1.27627	0.20292
I57_WO_LE	-0.00912	0.08908	-0.10239	0.91852
I59_LES_LE	0.06758	0.23226	0.29094	0.77131
I60_MM_LE	0.02891	0.1677	0.1724	0.86325
I65_BF_LE	-0.02015	0.19806	-0.10175	0.91903
I67_ONIX_LE	0.4766	0.99669	0.47818	0.6329
I70_BATP_LE	-0.30865	0.1777	-1.7369	0.0835
I71_TABU_LE	-0.08636	0.18692	-0.46204	0.64441
11				
(Intercept)	-1.50312	0.48163	-3.12091	0.00198
I15_BII_LE	-0.43496	0.58005	-0.74988	0.45392
I20_AGLE_LE	-0.2497	0.40143	-0.62202	0.5344
I23_BAG_LE	-0.69807	0.25879	-2.69745	0.00738
I24_VIC_LE	-0.31026	0.41288	-0.75145	0.45297
I60_MM_LE	-0.26391	0.34669	-0.76125	0.44711
I63_ED_LE	-0.11098	0.15537	-0.71425	0.47563
I66_BFI_LE	-0.47509	0.70178	-0.67698	0.49894
I67_ONIX_LE	1.55236	1.60093	0.96966	0.333
I68_VELEO_LE	-0.31284	0.21632	-1.44621	0.14917
I69_CLIP_LE	0.16141	0.38618	0.41797	0.67627
I71_TABU_LE	0.06582	0.27195	0.24202	0.80893
I72_EVLE_LE	0.15944	0.29026	0.54932	0.5832
12				
(Intercept)	14.93703	11.57393	1.29058	0.19788
I12_size	-1.36159	1.17015	-1.1636	0.24554
I12_PBV	-2.65353	0.44716	-5.93421	0
I7_BM_LE	-0.42446	0.1806	-2.35032	0.01943
I8_BLEI_LE	-0.06978	0.13361	-0.5223	0.60186
I10_BCA_LE	-0.00718	0.14473	-0.04962	0.96046
I18_KENT_LE	-0.0465	0.06992	-0.66511	0.50651
I20_AGLE_LE	-0.18788	0.10084	-1.86306	0.06347
I23_BAG_LE	-0.26743	0.12494	-2.14038	0.03316
I25_PMB_LE	-0.04574	0.10802	-0.42344	0.67229
I26_SIO_LE	-0.02883	0.11896	-0.24233	0.80869
I27_PAN_LE	-0.11674	0.06486	-1.7998	0.07293
I31_OTIO_LE	0.02902	0.10247	0.28321	0.77722
I32_NEG_LE	0.11473	0.1428	0.80343	0.42238
I43_DE_LE	4.45118	2.30456	1.93147	0.0544

I44_SMM_LE	0.00474	0.10086	0.04698	0.96256
I54_AD_LE	-0.08862	0.0578	-1.53316	0.12633
I61_LS_LE	-0.01414	0.06115	-0.23122	0.81731
I66_BFI_LE	-0.47436	0.08112	-5.84729	0
I68_VELEO_LE	0.29325	0.06622	4.4283	0.00001
I69_CLIP_LE	-0.04972	0.06342	-0.78393	0.43372
I71_TABU_LE	-0.31575	0.08237	-3.83345	0.00015
13				
(Intercept)	-1.5624	0.24781	-6.30478	0
I7_BM_LE	-0.27647	0.33302	-0.83018	0.40709
I20_AGLE_LE	-0.05493	0.38262	-0.14356	0.88595
I23_BAG_LE	-0.96794	0.28881	-3.35148	0.00091
I24_VIC_LE	-0.28425	0.29489	-0.96391	0.33586
I49_MNC_LE	-0.20978	0.07462	-2.8114	0.00525
I50_TFI_LE	-0.27402	0.23957	-1.14383	0.2536
I66_BFI_LE	-0.54707	0.19785	-2.76502	0.00604
14				
(Intercept)	0.92019	0.71285	1.29086	0.19776
I14_PBV	-1.50833	0.5383	-2.80202	0.00541
I14_DAM_log	-0.09184	0.059	-1.55661	0.12063
JCI_INDEX	-0.01867	0.06944	-0.26882	0.78826
I7_BM_LE	-1.0111	0.2642	-3.827	0.00016
I8_BLEI_LE	-0.15106	0.34235	-0.44126	0.65935
I10_BCA_LE	0.13736	0.30492	0.45048	0.6527
I15_BII_LE	-0.16859	0.16902	-0.99744	0.31936
I25_PMB_LE	-0.10974	0.2216	-0.4952	0.62082
I29_PEMB_LE	-0.44261	0.33724	-1.31244	0.19039
I30_DIOLE_LE	-0.41965	0.43607	-0.96234	0.33666
I35_MITLE_LE	0.07702	0.15859	0.48567	0.62756
I43_DE_LE	8.6193	4.37688	1.96928	0.04985
I48_ATP_LE	-0.25478	0.089	-2.86283	0.0045
I77_SALEA_LE	-1.14793	1.35124	-0.84953	0.39627
15				
(Intercept)	-0.81308	0.42122	-1.93033	0.05451
I14_DAM_LE	-0.02535	0.15872	-0.1597	0.87323
I16_BCN_LE	-0.49185	0.20471	-2.40273	0.01688
I27_PAN_LE	-0.17368	0.17617	-0.98587	0.32499
I36_MAYA_LE	-0.30652	0.12266	-2.49902	0.01299
I43_DE_LE	-13.7579	6.969	-1.97415	0.04928
I57_WO_LE	0.08061	0.10145	0.79461	0.42747
I58_PG_LE	-0.12859	0.23318	-0.55147	0.58172

I63_ED_LE	-0.10028	0.05788	-1.73266	0.08418
I64_CI_LE	0.01936	0.0555	0.34889	0.72742
I69_CLIP_LE	-0.09519	0.25453	-0.37396	0.7087
16				
(Intercept)	8.81018	27.62944	0.31887	0.75005
I16_size	-0.89596	2.67778	-0.33459	0.73817
I7_BM_LE	-0.22486	0.22469	-1.00074	0.31777
I15_BII_LE	-0.28954	0.14667	-1.97407	0.0493
I17_PELE_LE	-0.18078	0.1386	-1.30426	0.19316
I22_TAB_LE	-0.27728	0.19129	-1.44949	0.14826
I24_VIC_LE	-0.34471	0.25007	-1.37845	0.1691
I25_PMB_LE	-0.40036	0.20859	-1.91939	0.0559
I26_SIO_LE	-0.01855	0.27459	-0.06756	0.94618
I27_PAN_LE	-0.51216	0.15954	-3.21019	0.00147
I32_NEG_LE	0.1405	0.1972	0.71248	0.47673
I40_BHI_LE	0.20409	2.36949	0.08613	0.93142
I45_NIC_LE	-0.21793	0.08906	-2.44709	0.01498
I57_WO_LE	0.03901	0.12386	0.31492	0.75305
I69_CLIP_LE	-0.03727	0.12165	-0.30637	0.75953
I71_TABU_LE	-0.04823	0.1867	-0.25835	0.79632
18				
(Intercept)	-5.72955	2.67836	-2.1392	0.03325
I18_PBV	1.65299	2.05103	0.80593	0.42094
I18_KENT_log	-0.11281	0.20629	-0.54688	0.58488
Indonesia_F_Index	0.35552	0.14762	2.40844	0.01664
I4_PTB_LE	1.11853	1.49659	0.74738	0.45543
I8_BLEI_LE	-1.16506	0.53988	-2.15798	0.03174
I12_BUKO_LE	-0.71233	0.68363	-1.04198	0.29828
I13_WOO_LE	0.48884	0.33546	1.45724	0.14612
I17_PELE_LE	-1.61405	0.69205	-2.33229	0.02036
I20_AGLE_LE	0.41566	0.83148	0.49991	0.61752
I21_EKON_LE	-0.2451	0.32074	-0.76416	0.44538
I23_BAG_LE	-0.50346	0.55924	-0.90025	0.36872
I27_PAN_LE	-0.71128	0.59322	-1.19901	0.23149
I37_PANI_LE	3.49599	1.57723	2.21654	0.02742
I46_PI_LE	0.37252	0.44938	0.82898	0.40779
I52_TS_LE	0.96019	0.46211	2.07786	0.03859
I53_PTP_LE	0.2507	0.52954	0.47344	0.63625
I61_LS_LE	0.14956	0.30186	0.49546	0.62065
I64_CI_LE	0.06828	0.127	0.53765	0.59123
19				

(Intercept)	-1.52799	0.38577	-3.96089	0.00009
I11_BUMI_LE	-0.20711	0.2264	-0.9148	0.36102
I12_BUKO_LE	-0.34846	0.18429	-1.89084	0.05959
I32_NEG_LE	-0.19083	0.17625	-1.08275	0.27977
I40_BHI_LE	0.39539	2.31143	0.17106	0.86429
I53_PTP_LE	-0.74183	0.64546	-1.1493	0.25133
I71_TABU_LE	-0.16317	0.14692	-1.1106	0.26761
20				
(Intercept)	-4.01172	0.98591	-4.06905	0.00006
I56_YS_LE	0.25327	0.09658	2.62243	0.00916
22				
(Intercept)	11.88238	11.87987	1.00021	0.31804
I22_size	-1.13332	0.98975	-1.14506	0.25313
I22_LEV	-0.46302	0.34735	-1.33298	0.18359
I22_PBV	-0.38712	0.27502	-1.40763	0.16032
JCI_VOL	0.08011	0.03319	2.41371	0.01641
I5_BMI_LE	0.85589	0.71133	1.20322	0.22987
I6_BQI_LE	-0.18185	0.04085	-4.45149	0.00001
I7_BM_LE	-0.78972	0.13514	-5.84362	0
I8_BLEI_LE	0.72393	0.10266	7.05185	0
I10_BCA_LE	-0.44676	0.1681	-2.65773	0.0083
I11_BUMI_LE	0.25148	0.05441	4.62204	0.00001
I14_DAM_LE	-0.11081	0.1314	-0.84328	0.39977
I15_BII_LE	-0.28718	0.08399	-3.41923	0.00072
I23_BAG_LE	-0.09131	0.11418	-0.79971	0.42453
I32_NEG_LE	0.01231	0.1323	0.09308	0.92591
I45_NIC_LE	0.11318	0.04408	2.56773	0.01074
I46_PI_LE	0.10298	0.04014	2.56577	0.0108
I48_ATP_LE	0.03388	0.03534	0.95865	0.33854
I64_CI_LE	0.03573	0.10788	0.33125	0.7407
I66_BFI_LE	0.03905	0.07139	0.54691	0.58486
I68_VELEO_LE	-0.18598	0.04584	-4.0569	0.00006
I69_CLIP_LE	-0.03447	0.10782	-0.31966	0.74946
I74_TIFA_LE	-0.14893	0.03364	-4.42745	0.00001
23				
(Intercept)	-1.12618	0.45605	-2.46945	0.01408
I3_BP_LE	-0.45251	0.19036	-2.3771	0.01807
I8_BLEI_LE	-0.06463	0.29163	-0.22161	0.82476
I11_BUMI_LE	-0.41576	0.26964	-1.54192	0.12413
I12_BUKO_LE	-0.11099	0.28528	-0.38906	0.6975
I13_WOO_LE	-0.22293	0.14037	-1.58821	0.11328

I67_ONIX_LE	-0.79026	1.48513	-0.53211	0.59504
I68_VELEO_LE	0.08664	0.14298	0.60594	0.54501
24				
(Intercept)	-0.95183	0.26095	-3.64749	0.00031
I24_VIC_log	-0.28312	0.1029	-2.75149	0.00629
I10_BCA_LE	-0.7464	0.14524	-5.13924	0
I11_BUMI_LE	-0.04484	0.06439	-0.69643	0.4867
I13_WOO_LE	-0.08073	0.09528	-0.84727	0.39752
I16_BCN_LE	-0.11406	0.21546	-0.5294	0.59692
I53_PTP_LE	-0.20763	0.09573	-2.16879	0.03088
I66_BFI_LE	0.03498	0.1186	0.29491	0.76827
I67_ONIX_LE	-2.39052	0.38843	-6.15434	0
I71_TABU_LE	-0.04671	0.13433	-0.34772	0.72829
26				
(Intercept)	-0.85294	0.24154	-3.53118	0.00048
I26_SIO_log	-0.20312	0.16009	-1.26877	0.20551
I12_BUKO_LE	-0.34443	0.10094	-3.41224	0.00073
I13_WOO_LE	-0.17884	0.09969	-1.79392	0.07384
I16_BCN_LE	-0.1507	0.09582	-1.57274	0.11684
I30_DIOLE_LE	-0.68333	0.34861	-1.96018	0.05091
I33_MEST_LE	0.65674	0.33273	1.9738	0.04933
I53_PTP_LE	-0.23344	0.10532	-2.21643	0.02742
I57_WO_LE	0.03698	0.07957	0.46478	0.64243
I65_BF_LE	0.0805	0.09444	0.8524	0.39468
I66_BFI_LE	-0.05416	0.14282	-0.37923	0.70479
I69_CLIP_LE	-0.23518	0.1043	-2.25478	0.02487
I70_BATP_LE	-0.45578	0.23231	-1.96197	0.0507
I73_LEB_LE	-0.22734	0.26129	-0.87006	0.38497
27				
(Intercept)	-1.53428	0.31836	-4.81935	0
I12_BUKO_LE	0.0289	0.30348	0.09523	0.9242
I15_BII_LE	-0.32191	0.3214	-1.00156	0.31741
I16_BCN_LE	0.13927	0.28501	0.48863	0.62548
I18_KENT_LE	-0.07448	0.16817	-0.44287	0.6582
I23_BAG_LE	-0.11363	0.40166	-0.2829	0.77746
I24_VIC_LE	0.00523	0.24303	0.02154	0.98283
I25_PMB_LE	0.04968	0.24802	0.20031	0.84138
I26_SIO_LE	-0.15731	0.34225	-0.45962	0.64614
I28_PELED_LE	0.18347	0.32895	0.55773	0.57747
I29_PEMB_LE	-0.52396	0.31561	-1.66014	0.09799
I31_OTIO_LE	0.07948	0.22694	0.35023	0.72642

I43_DE_LE	0.64644	3.50448	0.18446	0.85378
I45_NIC_LE	-0.01528	0.1222	-0.12508	0.90055
I47_KG_LE	0.06148	0.69583	0.08835	0.92966
I49_MNC_LE	0.0522	0.10556	0.49454	0.62131
I50_TFI_LE	0.13257	0.23828	0.55636	0.5784
I52_TS_LE	0.00564	0.2355	0.02397	0.9809
I53_PTP_LE	-0.57735	0.17905	-3.22457	0.00141
I57_WO_LE	-0.00616	0.14362	-0.04289	0.96582
I61_LS_LE	0.04852	0.22604	0.21464	0.8302
I65_BF_LE	-0.09678	0.16466	-0.58776	0.55716
I69_CLIP_LE	-0.13274	0.36421	-0.36446	0.71578
I70_BATP_LE	-0.05125	0.40762	-0.12572	0.90004
I71_TABU_LE	-0.12891	0.20388	-0.63231	0.5277
I72_EVLE_LE	-0.04086	0.16953	-0.241	0.80973
I73_LEB_LE	0.1348	0.5702	0.23642	0.81328
28I74_TIFA_LE	-0.06341	0.33085	-0.19166	0.84815
28				
(Intercept)	-1.06559	0.66972	-1.59111	0.11261
I28_PERD_log	-0.53901	0.40351	-1.3358	0.1826
I65_BF_LE	0.07699	0.05626	1.36844	0.17217
29				
(Intercept)	-0.57559	0.25921	-2.22059	0.02712
I29_PEMB_log	0.14612	0.1435	1.01823	0.30939
I3_BP_LE	-0.32808	0.10569	-3.10408	0.00209
I8_BLEI_LE	0.19617	0.2011	0.97548	0.33011
I14_DAM_LE	-0.0743	0.17204	-0.43188	0.66614
I17_PELE_LE	-0.45854	0.25946	-1.76726	0.0782
I25_PMB_LE	-0.28885	0.30217	-0.95592	0.33988
I32_NEG_LE	-0.38526	0.23337	-1.65089	0.0998
I40_BHI_LE	0.22475	1.27554	0.1762	0.86026
I52_TS_LE	-0.06859	0.06597	-1.03971	0.29931
I70_BATP_LE	-0.29153	0.81158	-0.35921	0.71969
32				
(Intercept)	-1.36228	0.92915	-1.46616	0.14365
I32_PBV	0.39453	0.5791	0.68129	0.49621
I32_NEG_log	-0.09737	0.07882	-1.23524	0.2177
I7_BM_LE	-0.38426	0.17032	-2.25611	0.02478
I8_BLEI_LE	-0.20161	0.27233	-0.74032	0.45968
I10_BCA_LE	-0.33354	0.60657	-0.54988	0.58281
I12_BUKO_LE	-0.09347	0.14521	-0.64369	0.52027
I20_AGLE_LE	-0.14361	0.21226	-0.67657	0.4992

I25_PMB_LE	0.02938	0.07523	0.39056	0.6964
I29_PEMB_LE	-0.18262	0.22191	-0.82295	0.41119
I61_LS_LE	-0.19298	0.11726	-1.6458	0.10085
34				
(Intercept)	-1.64326	0.63322	-2.59511	0.00991
I34_MASP_log	-0.61613	0.36084	-1.70748	0.08875
JIIN3M_Index	-0.28579	0.35832	-0.79757	0.42574
I6_BQI_LE	-0.11402	0.51158	-0.22288	0.82378
I28_PELED_LE	-1.7076	1.30503	-1.30847	0.1917
I38_BAT_LE	0.05975	0.50811	0.11759	0.90647
I56_YS_LE	-0.30131	0.35929	-0.83864	0.40233
I58_PG_LE	0.23474	0.49797	0.47138	0.6377
35				
(Intercept)	-0.00206	0.39616	-0.0052	0.99585
I35_PBV	-3.65856	0.47436	-7.71255	0
I35_MITlog_log	0.37782	0.18519	2.04021	0.04223
JCI_VOL	0.00007	0.0154	0.00446	0.99644
I3_BP_LE	-0.00006	0.05209	-0.00122	0.99903
I4_PTB_LE	4.24495	1.83227	2.31677	0.02121
I6_BQI_LE	0.04984	0.30343	0.16427	0.86963
I7_BM_LE	-0.00012	0.2211	-0.00052	0.99958
I17_PELE_LE	0.00001	0.07872	0.00014	0.99988
I19_CAP_LE	0.00004	0.02725	0.00157	0.99875
I20_AGLE_LE	-0.00005	0.09734	-0.00048	0.99962
I21_EKON_LE	0.00001	0.05092	0.00018	0.99985
I29_PEMB_LE	0.00012	0.50558	0.00024	0.99981
I30_DIOLE_LE	0.04804	0.93674	0.05128	0.95914
I39_BY_LE	-1.23742	1.15191	-1.07424	0.28361
I52_TS_LE	0.00004	0.03532	0.00104	0.99917
I57_WO_LE	0.00005	0.05189	0.00096	0.99924
I58_PG_LE	-0.31758	0.06808	-4.66503	0
I63_ED_LE	0.00003	0.04833	0.00053	0.99957
I73_LEB_LE	0.00007	0.16249	0.00044	0.99965
I74_TIFA_LE	-0.10995	0.40378	-0.27231	0.78558
36				
(Intercept)	-1.95552	3.21864	-0.60756	0.54394
I36_DE	-0.11577	0.14086	-0.8219	0.41179
I36_PBV	-2.79139	1.0297	-2.71088	0.0071
JCI_VOL	0.29506	0.14621	2.01806	0.04448
I15_BII_LE	-0.82549	0.74436	-1.10899	0.26833
I17_PELE_LE	-0.20544	0.62249	-0.33004	0.7416

I25_PMB_LE	-0.54868	0.71755	-0.76465	0.44508
I45_NIC_LE	0.36982	0.16538	2.2362	0.02608
I51_PAC_LE	0.40965	0.53808	0.76133	0.44706
I54_AD_LE	0.76846	0.67515	1.1382	0.25595
I57_WO_LE	-0.45018	0.58171	-0.77389	0.43961
I66_BFI_LE	-0.00537	0.52899	-0.01015	0.99191
I71_TABU_LE	-0.26949	0.51314	-0.52518	0.59985
37				
(Intercept)	0	0.05364	0	1
I37_PANI_log	0.09575	0.08211	1.1661	0.24448
I5_BMI_LE	-4.00075	0.51908	-7.70741	0
I25_PMB_LE	-0.1589	0.17412	-0.91258	0.36218
I57_WO_LE	0	0.02242	0	1
I61_LS_LE	-0.0672	0.04973	-1.35113	0.17765
45	Value	Std.	Error	t
(Intercept)	1.47221	3.46584	0.42478	0.6713
I45_PBV	-39.1339	19.64699	-1.99185	0.04727
JIIN3M_Index	-0.014	0.65704	-0.02131	0.98301
I3_BP_LE	-0.77961	0.551	-1.41491	0.15811
I14_DAM_LE	0.08615	0.99994	0.08616	0.9314
46				
(Intercept)	-3.88227	1.06121	-3.65833	0.0003
I46_PBV	0.33782	0.12466	2.71007	0.00711
I9_PBM_LE	-2.03522	0.11635	-17.4922	0
I17_PELE_LE	-0.32282	0.13751	-2.3477	0.01953
I29_PEMB_LE	-0.8893	2.32822	-0.38196	0.70275
I60_MM_LE	0.00136	0.15898	0.00855	0.99319
47				
(Intercept)	-1.71146	0.82933	-2.06366	0.03995
I47_KG_log	0.26427	0.18855	1.4016	0.16212
JCI_VOL	0.06804	0.04339	1.56807	0.11797
JCI_INDEX	0.03169	0.09784	0.32393	0.74623
I6_BQI_LE	0.14235	0.52839	0.26941	0.78781
I8_BLEI_LE	-0.12057	0.34862	-0.34584	0.72972
I12_BUKO_LE	-0.10235	0.34781	-0.29427	0.76876
I14_DAM_LE	-0.04602	0.40595	-0.11336	0.90983
I16_BCN_LE	-0.17577	0.31635	-0.55562	0.57891
I23_BAG_LE	0.03922	0.45552	0.0861	0.93145
I24_VIC_LE	0.0712	0.31385	0.22684	0.82071
I31_OTIO_LE	-0.24663	0.25456	-0.96885	0.33344
I35_MITLE_LE	0.20235	0.28102	0.72005	0.47208

I37_PANI_LE	-0.13385	1.07153	-0.12491	0.90068
I45_NIC_LE	0.06187	0.13041	0.47441	0.63557
I46_PI_LE	0.05313	0.20698	0.25667	0.79762
I58_PG_LE	-0.96196	0.38321	-2.51028	0.01262
I59_LES_LE	0.16856	0.30012	0.56165	0.57479
I61_LS_LE	0.03939	0.17357	0.22695	0.82063
I64_CI_LE	-0.22748	0.08975	-2.5346	0.01179
I65_BF_LE	-0.01491	0.08806	-0.16928	0.8657
I66_BFI_LE	-0.05736	0.21808	-0.26302	0.79273
I67_ONIX_LE	-2.11783	2.49762	-0.84794	0.39718
I68_VELEO_LE	-0.24694	0.17902	-1.37943	0.16884
I70_BATP_LE	-0.5276	0.78736	-0.67009	0.50335
I71_TABU_LE	-0.14948	0.26642	-0.56106	0.5752
I73_LEB_LE	-0.71366	0.93957	-0.75957	0.44814
49				
(Intercept)	-4.47681	1.80893	-2.47483	0.01389
I49_PBV	0.62601	0.76932	0.81373	0.41645
I49_MNC_log	-0.31599	0.13086	-2.41468	0.01635
JCI_INDEX	0.2278	0.14617	1.55841	0.1202
I8_BLEI_LE	0.50514	0.66236	0.76265	0.44628
I9_PBM_LE	-0.16086	0.32987	-0.48764	0.62616
I10_BCA_LE	-0.08707	0.9163	-0.09503	0.92436
I12_BUKO_LE	-0.02658	0.69038	-0.0385	0.96931
I13_WOO_LE	-1.19478	0.29602	-4.03619	0.00007
I24_VIC_LE	-0.55067	0.62772	-0.87725	0.38106
I53_PTP_LE	-1.24029	0.51702	-2.39892	0.01706
I68_VELEO_LE	-0.15308	0.22849	-0.67	0.50338
I72_EVLE_LE	-0.48046	0.35608	-1.3493	0.17827
I73_LEB_LE	0.18998	0.84178	0.22568	0.8216
50				
(Intercept)	4.75831	0.88318	5.3877	0
I50_PBV	-6.92339	1.0247	-6.75653	0
I50_TFI_log	0.29462	0.16416	1.79476	0.07368
I2_BON_LE	2.54192	0.93026	2.73248	0.00665
I44_SMM_LE	-0.28253	0.16751	-1.68664	0.0927
I52_TS_LE	0.10603	0.09815	1.08028	0.28087
I64_CI_LE	0.01331	0.02991	0.445	0.65663
52				
(Intercept)	0.30888	1.20966	0.25535	0.79863
I52_MM	5.14514	2.64879	1.94245	0.05303
I52_PBV	-3.23364	1.2817	-2.52294	0.01216

I52_TS_log	-0.1544	0.16069	-0.9609	0.33739
Indonesia_F_Index	0.14334	0.06497	2.20631	0.02813
I6_BQI_LE	-0.07036	0.15505	-0.45376	0.65033
I7_BM_LE	-0.21707	0.42919	-0.50577	0.6134
I8_BLEI_LE	-0.08328	0.38625	-0.2156	0.82945
I13_WOO_LE	0.12199	0.25114	0.48575	0.6275
I18_KENT_LE	0.42509	0.11896	3.57345	0.00041
I19_CAP_LE	-0.2092	0.26668	-0.78448	0.43339
I21_EKON_LE	0.08406	0.12854	0.65395	0.51365
I27_PAN_LE	-0.31163	0.31502	-0.98925	0.32335
I31_OTIO_LE	0.10578	0.46501	0.22747	0.82022
I50_TFI_LE	0.13537	0.72618	0.18641	0.85225
I63_ED_LE	-0.21298	0.14497	-1.46914	0.14286
53				
(Intercept)	-0.26403	0.70664	-0.37363	0.70895
I53_PBV	-0.02428	0.27228	-0.08918	0.929
I7_BM_LE	0.39643	0.31939	1.24122	0.21551
I17_PELE_LE	-0.64938	0.1108	-5.86097	0
I20_AGLE_LE	-0.20529	0.19266	-1.06556	0.28749
I27_PAN_LE	-0.54362	0.22747	-2.38988	0.01748
I32_NEG_LE	-0.41411	0.37231	-1.11226	0.26693
I33_MEST_LE	-0.30436	0.40264	-0.75592	0.4503
I46_PI_LE	0.22324	0.52687	0.42372	0.67208
I48_ATP_LE	-0.19415	0.2198	-0.88329	0.3778
I49_MNC_LE	-0.11655	0.12526	-0.93049	0.35288
I54_AD_LE	-0.65263	0.51256	-1.27327	0.20392
I57_WO_LE	-0.26511	0.14638	-1.81113	0.07114
I59_LES_LE	0.09927	0.42808	0.23189	0.81678
I61_LS_LE	-0.05773	0.1918	-0.30102	0.76361
I67_ONIX_LE	-0.65711	1.02895	-0.63862	0.52357
I69_CLIP_LE	-0.00931	0.12894	-0.07222	0.94247
54				
(Intercept)	-2.31701	1.13473	-2.04191	0.04203
JCI_VOL	0.05832	0.05129	1.13719	0.25636
I3_BP_LE	0.07282	0.10028	0.72614	0.46832
I8_BLEI_LE	0.12697	0.18032	0.70417	0.48187
I12_BUKO_LE	-0.47263	0.51568	-0.91652	0.36013
I34_MASP_LE	-1.17433	0.28307	-4.14851	0.00004
I53_PTP_LE	-0.47333	0.24807	-1.90807	0.05733
I59_LES_LE	-0.67784	1.81829	-0.37279	0.70956
I69_CLIP_LE	-0.13287	0.11636	-1.14183	0.25443

I71_TABU_LE	-0.46662	0.30111	-1.54967	0.12227
I77_SALEA_LE	0.21074	0.27826	0.75733	0.44944
56				
(Intercept)	-0.77379	2.66847	-0.28998	0.77203
I56_PBV	-6.53988	5.53497	-1.18156	0.23831
I56_YS_log	-0.39303	0.2325	-1.69041	0.09198
I11_BUMI_LE	-0.67682	1.09	-0.62094	0.53511
I27_PAN_LE	-0.05497	0.5844	-0.09407	0.92512
I48_ATP_LE	-1.29947	0.54518	-2.38356	0.01776
I50_TFI_LE	-0.53034	0.88197	-0.60131	0.54808
I63_ED_LE	-0.14139	0.1753	-0.80655	0.42056
I71_TABU_LE	-1.23405	1.30184	-0.94793	0.34393
I72_EVLE_LE	0.25918	0.40796	0.6353	0.52571
57				
(Intercept)	-6.04917	1.33818	-4.52043	0.00001
I57_WO_log	-0.36476	0.08892	-4.10235	0.00005
JCI_VOL	0.2018	0.07125	2.83229	0.00494
I5_BMI_LE	-3.98926	1.40278	-2.84382	0.00477
I12_BUKO_LE	0.08413	0.29248	0.28764	0.77382
I16_BCN_LE	-0.05632	0.25179	-0.22369	0.82315
I25_PMB_LE	0.11575	0.16379	0.70672	0.4803
I26_SIO_LE	0.25537	0.28508	0.8958	0.37108
I32_NEG_LE	0.23422	0.1945	1.20422	0.22946
I49_MNC_LE	-0.01331	0.08215	-0.16206	0.87137
I50_TFI_LE	0.23902	0.69623	0.34331	0.73161
I53_PTP_LE	-1.15548	0.24625	-4.69232	0
I60_MM_LE	-0.67742	0.20726	-3.2684	0.00121
I67_ONIX_LE	0.10745	2.79963	0.03838	0.96941
I71_TABU_LE	-0.23149	0.1692	-1.36821	0.17228
58				
(Intercept)	-2.00105	0.26575	-7.52993	0
I58_PG_log	-0.35355	0.03771	-9.37599	0
I47_KG_LE	-0.48014	0.29111	-1.64937	0.10009
59				
(Intercept)	-1.46628	0.62744	-2.33693	0.02009
I7_BM_LE	-0.22563	0.45162	-0.4996	0.61772
I8_BLEI_LE	-0.14034	0.38617	-0.3634	0.71655
I26_SIO_LE	-0.15511	0.44817	-0.3461	0.7295
I53_PTP_LE	-0.27801	0.17853	-1.55723	0.12045
I66_BFI_LE	-0.05741	0.74207	-0.07737	0.93838
61				

(Intercept)	-1.41653	0.57014	-2.48452	0.01351
I15_BII_LE	-1.48268	1.18789	-1.24816	0.21293
I16_BCN_LE	-1.06349	0.65098	-1.63367	0.10336
I25_PMB_LE	-0.5132	0.80617	-0.6366	0.52487
I32_NEG_LE	-0.24822	0.58847	-0.42181	0.67346
I53_PTP_LE	-0.50568	0.28456	-1.77703	0.07656
I59_LES_LE	-0.17305	0.58189	-0.2974	0.76637
I69_CLIP_LE	0.11152	0.49151	0.22688	0.82067
62				
(Intercept)	0	0.30917	0	1
I62_LEV	0	0.26727	0	1
I62_PAV_log	0.97078	0.00705	137.7462	0
I4_PTB_LE	0	0.26209	0	1
I13_WOO_LE	0	0.00067	0	1
I21_EKON_LE	0	0.00078	0	1
I25_PMB_LE	0	0.0005	0	1
I60_MM_LE	0	0.00075	0	1
63				
(Intercept)	-0.68427	3.67776	-0.18606	0.85253
I63_PBV	-5.1265	5.12402	-1.00048	0.31788
I63_ED_log	-0.37083	0.15961	-2.32336	0.02083
I8_BLEI_LE	-0.08926	0.91084	-0.09799	0.922
I14_DAM_LE	-0.31403	0.80686	-0.3892	0.6974
I28_PELED_LE	0.06851	0.49693	0.13786	0.89044
I35_MITLE_LE	-0.25607	0.39467	-0.64883	0.51695
I44_SMM_LE	-0.42413	0.6662	-0.63664	0.52484
I51_PAC_LE	0.39742	0.43465	0.91434	0.36127
I52_TS_LE	-0.61302	1.50602	-0.40704	0.68427
I66_BFI_LE	-0.18331	0.5877	-0.31191	0.75533
I78_VIC_LE	-0.57939	0.86287	-0.67147	0.50244
66				
(Intercept)	-1.76799	0.70641	-2.50277	0.01286
I2_BON_LE	1.35966	2.06023	0.65996	0.50979
I11_BUMI_LE	-0.11263	0.31317	-0.35964	0.71937
I12_BUKO_LE	-0.44897	0.52127	-0.8613	0.38977
I13_WOO_LE	-0.62808	0.21587	-2.90956	0.00389
I22_TAB_LE	-0.27457	0.38937	-0.70517	0.48126
I24_VIC_LE	0.18624	0.32137	0.5795	0.56269
I40_BHI_LE	-0.04778	31.25915	-0.00153	0.99878
I45_NIC_LE	-0.08276	0.17147	-0.48267	0.62969
I53_PTP_LE	0.03789	0.20791	0.18222	0.85553

I59_LES_LE	0.01449	0.28585	0.05068	0.95962
I60_MM_LE	-0.25584	0.26679	-0.95895	0.33836
I67_ONIX_LE	-0.23998	1.79032	-0.13404	0.89346
I73_LEB_LE	-0.17413	0.71905	-0.24216	0.80882
67				
(Intercept)	-0.39679	0.03804	-10.4314	0
I67_ONIX_log	0.09922	0.17093	0.58046	0.56203
JIIN3M_Index	-0.01124	0.01722	-0.65261	0.51449
I43_DE_LE	-0.492	2.69974	-0.18224	0.85551
I78_VIC_LE	-0.00707	0.00735	-0.96298	0.33632
68				
(Intercept)	1.66258	1.39174	1.1946	0.23318
I68_VERO_log	-0.3248	0.08443	-3.84714	0.00015
INDON_CDS_5Y	-2.24862	0.6657	-3.3778	0.00083
I16_BCN_LE	0.13938	0.33446	0.41672	0.67718
I20_AGLE_LE	-0.57824	0.36858	-1.56886	0.11773
I21_EKON_LE	0.13777	0.20383	0.67589	0.49963
I23_BAG_LE	-1.0096	0.73492	-1.37375	0.17054
I34_MASP_LE	-0.1838	0.86319	-0.21293	0.83152
I40_BHI_LE	0.2508	11.32219	0.02215	0.98234
I66_BFI_LE	0.03936	0.1429	0.27543	0.78318
I70_BATP_LE	-0.73241	0.21412	-3.42053	0.00071
69				
(Intercept)	-0.20977	0.44132	-0.47534	0.6349
I69_MM	-5.41878	3.26706	-1.65861	0.09825
I11_BUMI_LE	-0.46377	0.22262	-2.08319	0.03809
I12_BUKO_LE	-0.33034	0.39714	-0.83179	0.40619
I15_BII_LE	-0.03854	0.5136	-0.07504	0.94023
I16_BCN_LE	-0.15254	0.44582	-0.34216	0.73247
I25_PMB_LE	0.04213	0.2665	0.1581	0.87448
I26_SIO_LE	-0.59158	0.3808	-1.55351	0.12136
I27_PAN_LE	-0.33155	0.41458	-0.79972	0.42451
I43_DE_LE	1.99356	9.52517	0.20929	0.83436
I54_AD_LE	-0.48644	0.30958	-1.57127	0.11718
I61_LS_LE	-0.18372	0.12552	-1.46367	0.14434
I64_CI_LE	0.04429	0.10045	0.4409	0.6596
I67_ONIX_LE	1.01783	1.36544	0.74542	0.45661
70				
(Intercept)	-1.50793	0.6261	-2.40845	0.0166
I13_WOO_LE	-0.18324	0.64146	-0.28566	0.77533
71				

(Intercept)	-1.48538	0.27508	-5.3998	0
I7_BM_LE	-0.90336	0.28785	-3.13828	0.00187
I8_BLEI_LE	-0.19013	0.22465	-0.84633	0.39803
I12_BUKO_LE	-0.0569	0.21762	-0.26147	0.79391
I16_BCN_LE	-0.31057	0.15153	-2.04951	0.04127
I20_AGLE_LE	-0.13728	0.22332	-0.61471	0.53921
I25_PMB_LE	-0.47822	0.34139	-1.40079	0.1623
I45_NIC_LE	0.04357	0.21124	0.20624	0.83674
I56_YS_LE	-0.08137	0.07643	-1.06467	0.28787
73				
(Intercept)	-1.85579	0.28542	-6.502	0
I73_logB_log	-0.23082	0.0997	-2.31508	0.02126
77				
(Intercept)	0.61341	0.3343	1.83491	0.06755
I77_MM	-2.00602	0.24461	-8.20084	0
I77_SARA_log	0.52327	0.19755	2.64872	0.00852
INDON_CDS_5Y	-0.10663	0.20423	-0.52208	0.60202
JCI_VOL	-0.0255	0.01585	-1.60889	0.10873
Indonesia_F_Index	0.0291	0.01291	2.25443	0.02492
I4_PTB_LE	2.5492	0.60254	4.23078	0.00003
I6_BQI_LE	0.00183	0.06317	0.02901	0.97688
I9_PBM_LE	0.04103	0.0855	0.47991	0.63166
I12_BUKO_LE	-0.0418	0.07492	-0.55796	0.5773
I14_DAM_LE	-0.32717	0.13047	-2.50769	0.0127
I16_BCN_LE	-0.11139	0.06927	-1.60796	0.10894
I23_BAG_LE	0.00806	0.05854	0.13773	0.89055
I25_PMB_LE	0.01092	0.05211	0.20949	0.83421
I27_PAN_LE	-0.00164	0.0536	-0.03062	0.97559
I44_SMM_LE	0.02383	0.06019	0.39592	0.69246
I45_NIC_LE	-0.03295	0.02108	-1.56332	0.11907
I52_TS_LE	0.06235	0.05185	1.2025	0.23016
I54_AD_LE	-0.11281	0.04279	-2.63602	0.00884
I55_HD_LE	-1.0557	0.44476	-2.37361	0.01827
I64_CI_LE	-0.01272	0.02098	-0.60656	0.54462
I73_LEB_LE	-0.08032	0.06838	-1.17465	0.2411
I78_VIC_LE	-0.22271	0.1422	-1.56623	0.11839
78				
(Intercept)	-0.00068	0.00124	-0.54963	0.583
I78_PBV	-4.38248	0.14137	-31.0001	0
I78_VIC_log	-0.64147	0.05463	-11.7412	0
JIIN3M_Index	-0.00017	0.00087	-0.19851	0.84279

I4_PTB_LE	-0.99725	0.5255	-1.89771	0.05875
I6_BQI_LE	0.07289	0.04128	1.76559	0.07854
I13_WOO_LE	-0.00002	0.00053	-0.03926	0.96871
I21_EKON_LE	-0.00001	0.00152	-0.00813	0.99352
I23_BAG_LE	0.00013	0.00093	0.14411	0.88552
I25_PMB_LE	-0.00008	0.002	-0.0408	0.96748
I27_PAN_LE	0.00008	0.00153	0.04958	0.9605
I28_PELED_LE	-0.04469	0.07855	-0.56894	0.56985
I29_PEMB_LE	-0.00012	0.0103	-0.01195	0.99047
I30_DIOLE_LE	0.39876	0.10644	3.74636	0.00022
I32_NEG_LE	-0.00007	0.00242	-0.02712	0.97838
I33_MEST_LE	1.06978	0.29531	3.62257	0.00035
I35_MITLE_LE	0.02949	0.061	0.48347	0.62913
I36_MAYA_LE	0.00004	0.00039	0.10394	0.91729
I37_PANI_LE	-0.34785	0.52462	-0.66305	0.50784
I40_BHI_LE	-0.08083	0.01037	-7.795	0
I55_HD_LE	0.66365	0.42923	1.54617	0.12318
I56_YS_LE	-0.00013	0.00701	-0.01889	0.98494
I59_LES_LE	0.00015	0.00627	0.02432	0.98061
I60_MM_LE	-0.00006	0.00222	-0.02759	0.97801
I63_ED_LE	-0.00012	0.03964	-0.00298	0.99762
I68_VELEO_LE	-0.00007	0.00226	-0.03156	0.97485
I70_BATP_LE	-0.00023	0.00153	-0.14838	0.88215
I74_TIFA_LE	0.0253	0.05024	0.50363	0.61492
I77_SALEA_LE	-0.19216	0.08069	-2.38137	0.01791

Dubai				
	Value	Std. Error	*t*-ratio	*p*-value
1				
(Intercept)	-3.39322	2.82179	-1.20251	0.23014
D1_DE	-0.01	0.03555	-0.28132	0.77866
D1_MM	2.30916	37.10195	0.06224	0.95042
D1_DIB_log	-0.34547	0.18721	-1.84541	0.06599
oil	-0.07628	0.06716	-1.13581	0.25696
Dubai_Banks_Index	0.2379	0.12523	1.89966	0.05846
USDAED_VOL	4.91714	5.15366	0.95411	0.34082
D4_MB_LE	0.84183	0.80883	1.0408	0.29883
D5_NBD_LE	-0.17095	0.38817	-0.44039	0.65998
D8_DI_LE	-0.08189	0.49546	-0.16529	0.86883
D9_SHC_LE	-0.01499	0.19091	-0.07849	0.93749
D11_DF_LE	-0.18238	0.44153	-0.41305	0.67987

D12_GGI_LE	-0.01275	0.18518	-0.06885	0.94516
D14_IAI_LE	-0.26127	0.3253	-0.80319	0.42252
D17_DOI_LE	0.08103	0.28016	0.28923	0.77261
D19_OIC_LE	-0.1017	0.20256	-0.50208	0.61599
D22_DI_LE	-0.06269	0.29352	-0.21359	0.83102
D24_TE_LE	0.08157	0.20025	0.40734	0.68406
D25_DALE_LE	0.12547	0.17213	0.72894	0.46662
2				
(Intercept)	-1.8814	5.45316	-0.34501	0.73033
D2_CB_log	-0.25827	0.2248	-1.14891	0.25151
oil	0.10668	0.1428	0.74706	0.45561
Dubai_Banks_Index	0.1841	0.0792	2.32449	0.02077
UAE_Interest_rate_swap	-0.57722	1.38813	-0.41583	0.67783
ABUD_CDS	1.72405	1.12048	1.53867	0.12494
D5_NBD_LE	0.12318	0.28144	0.43767	0.66194
D11_DF_LE	-0.02253	0.27513	-0.08188	0.9348
D14_IAI_LE	-0.2359	0.31752	-0.74294	0.4581
D16_DIC_LE	0.44367	0.58059	0.76416	0.44537
D18_OG_LE	0.22216	0.10363	2.14381	0.03285
D23_OI_LE	-18537.7	81869.5	-0.22643	0.82102
4				
(Intercept)	0.31066	40.17839	0.00773	0.99384
D4_size	-0.05116	6.37784	-0.00802	0.99361
D4_LEV	0.00446	2.57869	0.00173	0.99862
D4_DE	0.00019	0.26468	0.0007	0.99944
D4_MM	-0.05848	70.26634	-0.00083	0.99934
D4_PBV	0.01782	0.2062	0.08643	0.93119
D4_MB_log	0.99832	0.50398	1.98088	0.04859
oil	0	0.00106	-0.00018	0.99985
Dubai_Banks_Index	0.00002	0.00238	0.00961	0.99234
Budget_Balance_GDP	0.00085	0.15497	0.00549	0.99562
DFMGI_Index	-0.00002	0.00185	-0.0107	0.99147
UAE_Interest_rate_swap	-0.00017	0.0195	-0.00896	0.99286
USDAED_VOL	-0.00007	0.10117	-0.0007	0.99944
ABUD_CDS	0.00012	0.04649	0.00261	0.99792
D1_DIB_LE	0.00002	0.00493	0.00507	0.99596
D2_CB_LE	0.00001	0.0065	0.00179	0.99857
D5_NBD_LE	-0.00001	0.00468	-0.00271	0.99784
D6_AJ_LE	-0.00001	0.00461	-0.00147	0.99883
D8_DI_LE	0.00005	0.00594	0.00774	0.99383
D9_SHC_LE	0.00002	0.00334	0.00526	0.99581

D10_EMI_LE	0.09234	7.19627	0.01283	0.98977
D11_DF_LE	-0.00004	0.00567	-0.00639	0.99491
D12_GGI_LE	0.00002	0.00281	0.0067	0.99466
D14_IAI_LE	0	0.00465	0.00004	0.99997
D15_ALL_LE	9.18653	2730.865	0.00336	0.99732
D16_DIC_LE	0.00002	0.01008	0.00183	0.99854
D17_DOI_LE	-0.00001	0.00388	-0.00205	0.99837
D18_OG_LE	-0.00001	0.00197	-0.00327	0.9974
D19_OIC_LE	0.00001	0.00585	0.00184	0.99853
D20_ALEABS_LE	0	0.00533	0.00047	0.99962
D22_DI_LE	-0.00005	0.00468	-0.01051	0.99162
D23_OI_LE	-111.327	7647.314	-0.01456	0.9884
D24_TE_LE	0	0.00279	-0.00076	0.99939
D25_DALE_LE	-0.00001	0.0029	-0.002	0.99841
6				
(Intercept)	-1.97279	0.63702	-3.09691	0.00214
D6_AJ_log	-0.32711	0.06316	-5.17903	0
UAE_Interest_rate_swap	0.26186	0.19575	1.33771	0.18201
D1_DIB_LE	0.02048	0.33377	0.06137	0.9511
D4_MB_LE	1.74009	0.66787	2.60545	0.00963
D8_DI_LE	-0.00506	0.17197	-0.02941	0.97656
D9_SHC_LE	-0.0847	0.17075	-0.49607	0.62021
D11_DF_LE	-0.27553	0.18614	-1.4802	0.13987
D12_GGI_LE	0.06849	0.14295	0.47912	0.6322
D19_OIC_LE	-0.0583	0.107	-0.54485	0.58626
D22_DI_LE	-0.15826	0.18368	-0.86161	0.38959
D24_TE_LE	-0.06564	0.10553	-0.62199	0.53442
D25_DALE_LE	-0.21259	0.10837	-1.96175	0.05072
8				
(Intercept)	5.72224	6.91551	0.82745	0.40868
D8_DE	-0.0989	0.23969	-0.4126	0.68021
D8_MM	-7.78387	11.81467	-0.65883	0.51054
D8_PBV	-0.43131	0.74164	-0.58156	0.56133
D8_DI_log	-0.0669	0.06271	-1.06672	0.28701
oil	0.035	0.05295	0.66095	0.50919
Dubai_Banks_Index	-0.2382	0.12538	-1.89976	0.05849
Dubai_RE_Index	-0.22621	0.14399	-1.57104	0.1173
Budget_Balance_GDP	-0.0144	0.20616	-0.06984	0.94437
DFMGI_Index	0.47877	0.27329	1.75186	0.08089
UAE_Interest_rate_swap	-0.97353	0.6313	-1.54211	0.12417
USDAED_VOL	2.95291	2.13887	1.38059	0.1685

ABUD_CDS	-0.31198	1.46708	-0.21265	0.83175
D1_DIB_LE	-0.48574	0.19969	-2.43253	0.01562
D2_CB_LE	0.38718	0.25781	1.50181	0.13427
D4_MB_LE	-2.01441	0.94088	-2.14098	0.03314
D5_NBD_LE	0.0137	0.19705	0.06954	0.94461
D6_AJ_LE	0.34597	0.17972	1.92507	0.05523
D9_SHC_LE	0.09238	0.07625	1.21158	0.22669
D11_DF_LE	-0.99636	0.18164	-5.48547	0
D14_IAI_LE	-0.04849	0.18639	-0.26015	0.79494
D15_ALL_LE	47078.32	39195.65	1.20111	0.23072
D16_DIC_LE	0.08523	0.43264	0.197	0.84397
D17_DOI_LE	-0.11281	0.1263	-0.89317	0.37253
D18_OG_LE	0.04978	0.06667	0.74678	0.45582
D19_OIC_LE	-0.2992	0.10558	-2.8338	0.00493
D20_ALEABS_LE	-0.05882	0.65891	-0.08926	0.92894
D22_DI_LE	-0.15183	0.18871	-0.80458	0.42174
D23_OI_LE	-10038.5	43754.96	-0.22942	0.81871
D24_TE_LE	-0.08455	0.09367	-0.90265	0.36748
D25_DALE_LE	0.13947	0.097	1.43784	0.15159
9				
(Intercept)	235.7101	423.8461	0.55612	0.57857
D9_size	-43.7782	68.67458	-0.63747	0.52434
D9_LEV	25.92447	14.23643	1.821	0.06968
D9_MM	-4.58484	10.44472	-0.43896	0.66103
D9_PBV	-0.16699	1.45424	-0.11483	0.90866
D9_SHC_log	-0.21478	0.06998	-3.06904	0.00236
oil	0.0333	0.08865	0.37564	0.70747
Dubai_Banks_Index	-0.22169	0.19688	-1.12606	0.26111
Dubai_RE_Index	-0.12316	0.22075	-0.55789	0.57737
Budget_Balance_GDP	-0.68944	0.82689	-0.83378	0.40512
DFMGI_Index	0.4856	0.43224	1.12346	0.26221
UAE_Interest_rate_swap	-0.25573	1.23898	-0.2064	0.83663
USDAED_VOL	6.15839	5.6752	1.08514	0.2788
ABUD_CDS	-4.56782	2.83436	-1.61159	0.10819
D1_DIB_LE	-0.12783	0.28804	-0.44378	0.65755
D2_CB_LE	-0.11956	0.21616	-0.5531	0.58064
D4_MB_LE	-23.1848	7.31651	-3.16883	0.0017
D5_NBD_LE	-0.58649	0.22017	-2.66385	0.00818
D6_AJ_LE	-0.01694	0.33011	-0.05133	0.9591
D8_DI_LE	-0.30496	0.25195	-1.21037	0.22716
D10_EMI_LE	-172.076	58.33805	-2.94963	0.00345

D11_DF_LE	-0.00374	0.19468	-0.01923	0.98467
D12_GGI_LE	-0.15754	0.1166	-1.35107	0.17777
D14_IAI_LE	0.02258	0.205	0.11013	0.91239
D15_ALL_LE	27224.13	53970.46	0.50443	0.61436
D16_DIC_LE	0.23158	0.51662	0.44826	0.65431
D17_DOI_LE	0.14839	0.15282	0.97103	0.33238
D18_OG_LE	0.06937	0.32329	0.21456	0.83027
D19_OIC_LE	-0.16165	0.15513	-1.04201	0.29831
D20_ALEABS_LE	0.12094	1.10937	0.10902	0.91326
D22_DI_LE	-0.21858	0.14084	-1.55195	0.12181
D23_OI_LE	407107.9	83804.36	4.85784	0
D24_TE_LE	-0.13383	0.11894	-1.12523	0.26146
D25_DALE_LE	-0.01061	0.13064	-0.0812	0.93534
10				
(Intercept)	0.00063	0.06185	0.01021	0.99186
D10_LEV	-0.00013	0.01113	-0.01147	0.99086
D10_DE	0.00002	0.0007	0.02206	0.98241
D10_MM	-0.00259	0.12983	-0.01992	0.98412
D10_EMI_log	0.99942	0.35125	2.84534	0.00474
D4_MB_LE	0.00013	0.09098	0.00138	0.9989
11				
(Intercept)	-430.903	175.1578	-2.46008	0.01446
D11_size	73.53414	30.06555	2.44579	0.01503
D11_LEV	-73.2028	34.49173	-2.12233	0.03463
D11_DF_log	-0.18357	0.07889	-2.32703	0.02063
DFMGI_Index	0.09894	0.04946	2.00061	0.04634
D1_DIB_LE	-0.54297	0.33412	-1.62509	0.1052
D6_AJ_LE	-0.12839	0.24646	-0.52093	0.6028
D8_DI_LE	-0.66491	0.23878	-2.78465	0.0057
D9_SHC_LE	-0.13916	0.16404	-0.84833	0.39694
D12_GGI_LE	-0.24422	0.13494	-1.80986	0.07133
D14_IAI_LE	-0.28998	0.10493	-2.76359	0.00607
D20_ALEABS_LE	0.31709	1.67764	0.18901	0.85022
D23_OI_LE	-14134.8	17741.52	-0.79671	0.42626
D25_DALE_LE	-0.10335	0.09885	-1.04549	0.29665
12				
(Intercept)	-5.77221	2.73063	-2.11388	0.03536
D12_PBV	-1.17587	0.50054	-2.34924	0.01947
D12_GGI_log	-0.13004	0.13267	-0.98016	0.32781
DFMGI_Index	0.11715	0.14589	0.80304	0.42259
USDAED_VOL	6.01697	7.06449	0.85172	0.39506

D5_NBD_LE	-0.11553	0.476	-0.24271	0.8084
D6_AJ_LE	-0.26254	0.37317	-0.70353	0.48228
D8_DI_LE	0.1753	0.42438	0.41307	0.67986
D9_SHC_LE	-0.34406	0.6447	-0.53367	0.59397
D11_DF_LE	-0.46704	0.62426	-0.74814	0.45497
D16_DIC_LE	0.36612	3.19187	0.1147	0.90876
D18_OG_LE	0.29984	0.7011	0.42767	0.6692
D20_ALEABS_LE	0.09557	3.50042	0.0273	0.97824
D22_DI_LE	-0.10107	0.38414	-0.26311	0.79265
D23_OI_LE	44859.44	31534.61	1.42255	0.15592
D24_TE_LE	-0.10569	0.24202	-0.43669	0.66266
15				
(Intercept)	-5.31283	0.9557	-5.55908	0
D15_ALL_log	-58323	30848.71	-1.89061	0.05961
Budget_Balance_GDP	0.20092	0.16029	1.25345	0.21099
D19_OIC_LE	-0.03333	0.25091	-0.13285	0.8944
23				
(Intercept)	-1.17509	64.38655	-0.01825	0.98545
D23_size	-0.31853	10.80318	-0.02949	0.9765
D23_OI_log	37049.34	72968.51	0.50774	0.61199
24				
(Intercept)	-0.00002	0	-23.22	0
D24_DE	0	0	-2.35868	0.01898
D24_PBV	0	0	1.82848	0.06847
Budget_Balance_GDP	0	0	-46.3605	0
D6_AJ_LE	0	0	-0.73556	0.46257
D10_EMI_LE	-0.00002	0	-7.55065	0
D12_GGI_LE	0	0	0.88055	0.37927
D14_IAI_LE	0	0	0.23614	0.81348
D18_OG_LE	0	0	0.01543	0.9877
D19_OIC_LE	0	0	0.09324	0.92578
D22_DI_LE	0	0	-0.64674	0.51829
D25_DALE_LE	0	0	-0.45714	0.6479

Malaysia				
	Value	Std.Error	*t*-ratio	*p*-value
M5_AMM				

(Intercept)	-0.70559	0.16944	-4.16422	0.00004
M5_AMM_log	0.07549	0.05978	1.26279	0.20766
Budget_Balance_GDP	-0.51795	0.82973	-0.62424	0.53295
FTFBMPM	0.13783	0.04133	3.33475	0.00096
M3_BIMB_LE	0.20729	0.06585	3.14801	0.00181
M4_HLF_LE	-0.52009	0.13951	-3.72795	0.00023
M6_CIM_LE	-0.28436	0.13707	-2.07465	0.03888
M7_MAL_LE	-0.33829	0.21956	-1.54076	0.12444
M8_PUB_LE	0.13212	0.23698	0.5575	0.5776
M9_RHB_LE	-0.60859	0.07172	-8.48615	0
M10_ALL_LE	-0.03241	0.15642	-0.2072	0.836
M13_BUR_LE	-0.11684	0.12072	-0.96782	0.33392
M20_MB_LE	-0.01089	0.06749	-0.16132	0.87195
M22_HWA_LE	0.15183	0.13231	1.14749	0.25211
M31_TIH_LE	-0.20113	0.11427	-1.76016	0.07941
M6_CIM				
(Intercept)	-0.84601	1.52253	-0.55566	0.57887
M6_CIM_log	-0.05889	0.11893	-0.49514	0.62088
FBMKLCI_Index	0.00003	0.00089	0.03926	0.96871
FTFBMPM	-0.09562	0.12749	-0.74999	0.45387
M2_AFF_LE	-0.60528	0.24157	-2.50564	0.01277
M3_BIMB_LE	0.06468	0.20776	0.3113	0.7558
M4_HLF_LE	-0.00247	0.35096	-0.00704	0.99439
M5_AMM_LE	-0.29032	0.31194	-0.93067	0.35279
M7_MAL_LE	0.02249	0.33544	0.06706	0.94658
M8_PUB_LE	-0.01579	0.3272	-0.04825	0.96155
M9_RHB_LE	-0.34042	0.14442	-2.35708	0.01908
M11_RCE_LE	-0.07655	0.21984	-0.34821	0.72793
M12_OSK_LE	0.12173	0.12524	0.97199	0.33186
M13_BUR_LE	-0.38251	0.33956	-1.1265	0.26088
M14_APEX_LE	-0.44602	0.17537	-2.54324	0.0115
M19_ACS_LE	0.23198	0.17713	1.30966	0.19134
M22_HWA_LE	-0.08916	0.25997	-0.34296	0.73187
M29_AM_LE	0.00031	0.21203	0.00146	0.99883
M31_TIH_LE	-0.22943	0.22162	-1.03524	0.30141
M33_SYA_LE	-0.11936	0.18296	-0.65234	0.5147
M9_RHB				
(Intercept)	-0.52149	0.1311	-3.97765	0.00009
FTFBMPM	0.07813	0.05457	1.43173	0.15326
M4_HLF_LE	0.01843	0.13414	0.13739	0.89081
M5_AMM_LE	-0.14473	0.08035	-1.80119	0.07267

M6_CIM_LE	-0.28017	0.31459	-0.89059	0.37386
M7_MAL_LE	0.03836	0.26127	0.14681	0.88338
M10_ALL_LE	-0.3358	0.13332	-2.51883	0.01229
M11_RCE_LE	-0.01325	0.19262	-0.0688	0.94519
M29_AM_LE	0.15589	0.12672	1.23023	0.21957
M10_ALL				
(Intercept)	-0.48164	1.23405	-0.39029	0.69661
M10_ALL_MM	1.21098	11.28962	0.10726	0.91465
M10_ALL_PBV	-0.21931	0.60453	-0.36278	0.71703
M10_ALL_log	-0.14003	0.08473	-1.6526	0.09948
CDS_USD	0.2124	0.4962	0.42805	0.66893
FTFBMPM	0.05326	0.05435	0.97984	0.32797
M2_AFF_LE	0.0513	0.13175	0.38939	0.69727
M4_HLF_LE	-0.46381	0.24888	-1.86359	0.06338
M5_AMM_LE	-0.26884	0.2374	-1.13248	0.25836
M7_MAL_LE	-0.54722	0.28158	-1.94339	0.05293
M8_PUB_LE	0.06132	0.55215	0.11106	0.91164
M13_BUR_LE	-0.59892	0.17584	-3.40606	0.00075
M18_KUD_LE	-0.09846	0.14618	-0.67359	0.5011
M20_MB_LE	-0.11425	0.11372	-1.00467	0.31589
M24_KNN_LE	0.22005	0.1361	1.61684	0.10699
M25_PET_LE	-0.11066	0.3599	-0.30746	0.75871
M26_MAA_LE	0.04353	0.1313	0.33149	0.74051
M29_AM_LE	-0.17963	0.23606	-0.76095	0.4473
M11_RCE				
(Intercept)	-1.46085	0.31585	-4.62507	0.00001
FTFBMPM	0.23075	0.1321	1.74677	0.0817
M2_AFF_LE	0.18112	0.23975	0.75546	0.45057
M3_BIMB_LE	0.13074	0.32559	0.40153	0.68831
M5_AMM_LE	0.16793	0.37653	0.446	0.65592
M6_CIM_LE	-0.88031	0.23674	-3.71845	0.00024
M8_PUB_LE	-1.3398	2.6167	-0.51202	0.60901
M17_JH_LE	-0.23422	0.2075	-1.12876	0.2599
M24_KNN_LE	0.02497	0.20747	0.12037	0.90427
M27_PAC_LE	-0.05315	0.11503	-0.46205	0.64438
M12_OSK				
(Intercept)	-1.70653	0.68457	-2.49285	0.01322
M12_OSK_PBV	-0.7083	0.9723	-0.72848	0.4669
M12_OSK_log	-0.32739	0.09731	-3.3645	0.00087
M1_HL_LE	0.34412	0.65552	0.52496	0.60001
M3_BIMB_LE	-0.02492	0.29248	-0.08521	0.93216

M14_OSK_LE	0.06981	0.59453	0.11742	0.90661
M14_APEX_LE	-0.15469	0.1411	-1.09629	0.27385
M15_KAF_LE	-0.32288	0.25168	-1.28292	0.20053
M16_HLC_LE	0.14158	0.29553	0.47908	0.63224
M17_JH_LE	-0.15366	0.23265	-0.66047	0.50947
M21_ECM_LE	-0.06176	0.40237	-0.15348	0.87813
M22_HWA_LE	-0.89555	0.37722	-2.37407	0.01823
M23_ELK_LE	0.48542	0.31728	1.52994	0.1271
M24_KNN_LE	-0.14512	0.36825	-0.39407	0.69381
M26_MAA_LE	-0.03702	0.39154	-0.09455	0.92473
M27_PAC_LE	-0.14541	0.24599	-0.59112	0.55489
M13_BUR				
(Intercept)	-0.00859	0.57846	-0.01484	0.98817
FBMKLCI_Implied_Volatiltity	-0.09365	0.05013	-1.8681	0.06275
CDS_USD	0.03938	0.47047	0.08369	0.93336
FTFBMPM	0.12775	0.07451	1.71449	0.0875
M1_HL_LE	-0.69379	0.45651	-1.51976	0.12965
M2_AFF_LE	0.38347	0.14438	2.65592	0.00834
M3_BIMB_LE	-0.13755	0.17143	-0.80237	0.42299
M5_AMM_LE	0.23858	0.23484	1.01594	0.3105
M6_CIM_LE	-0.06899	0.14917	-0.46252	0.64405
M10_ALL_LE	-0.64567	0.19715	-3.27507	0.00118
M14_OSK_LE	-0.01909	0.11312	-0.16872	0.86613
M15_KAF_LE	-0.11085	0.15504	-0.71494	0.47522
M16_HLC_LE	0.02076	0.1366	0.15195	0.87933
M18_KUD_LE	-0.0971	0.14333	-0.67745	0.49866
M23_ELK_LE	0.0605	0.16702	0.36224	0.71743
M24_KNN_LE	-0.00557	0.13417	-0.04151	0.96692
M26_MAA_LE	0.05743	0.07689	0.74688	0.45574
M27_PAC_LE	-0.27087	0.22911	-1.18226	0.23806
M14_OSK				
(Intercept)	0.63671	1.4163	0.44956	0.65336
M14_OSK_log	-0.11924	0.12706	-0.93846	0.34878
FBMKLCI_Implied_Volatiltity	-0.04159	0.13088	-0.3178	0.75086
CDS_USD	-0.4395	1.53505	-0.28631	0.77485
Budget_Balance_GDP	5.10102	2.48537	2.05242	0.04102
FTFBMPM	0.2422	0.10686	2.26651	0.02415
M3_BIMB_LE	-0.27975	0.24103	-1.16062	0.24674
M7_MAL_LE	0.48756	0.69494	0.70159	0.48349
M9_RHB_LE	-0.8138	0.51031	-1.59471	0.11185
M12_OSK_LE	0.05737	0.19153	0.29952	0.76475

M15_KAF_LE	0.06562	0.27731	0.23662	0.81312
M16_HLC_LE	-0.14408	0.07718	-1.86688	0.06292
M17_JH_LE	-0.09566	0.15766	-0.60672	0.54451
M19_ACS_LE	0.08173	0.2687	0.30415	0.76123
M23_ELK_LE	0.01878	0.47683	0.03938	0.96861
M27_PAC_LE	0.03737	0.29537	0.12653	0.8994
M30_MHB_LE	0.28768	0.29751	0.96694	0.33437
M31_TIH_LE	-0.48402	0.32681	-1.48106	0.13967
M14_APEX				
(Intercept)	-1.32615	0.18594	-7.13235	0
FTFBMPM	0.1247	0.06925	1.80066	0.07277
M6_CIM_LE	0.11331	0.28773	0.39379	0.69402
M7_MAL_LE	-0.67597	0.60696	-1.11369	0.26631
M8_PUB_LE	0.02989	0.26406	0.11319	0.90996
M12_OSK_LE	-0.2672	0.14724	-1.81468	0.07058
M13_BUR_LE	0.08552	0.30912	0.27664	0.78225
M17_JH_LE	-0.00604	0.11846	-0.05098	0.95937
M19_ACS_LE	-0.55644	0.22016	-2.52747	0.01201
M27_PAC_LE	0.01412	0.18165	0.07775	0.93808
M29_AM_LE	0.10447	0.14357	0.72763	0.46741
M30_MHB_LE	-0.19078	0.12255	-1.55669	0.12061
M31_TIH_LE	-0.22125	0.12659	-1.74782	0.08152
M15_KAF				
(Intercept)	-0.62664	0.22143	-2.82994	0.00498
M15_KAF_SIZE	-0.43717	0.09843	-4.44166	0.00001
M15_KAF_log	-0.23407	0.06966	-3.36007	0.00088
FTFBMPM	0.09939	0.0482	2.06225	0.04006
M7_MAL_LE	0.09513	0.45835	0.20754	0.83573
M8_PUB_LE	-1.00672	0.51441	-1.95702	0.05129
M13_BUR_LE	-0.34452	0.23049	-1.49478	0.13604
M14_APEX_LE	-0.18846	0.12189	-1.54619	0.12313
M16_HLC_LE	0.02694	0.2078	0.12963	0.89695
M19_ACS_LE	-0.03916	0.16543	-0.23672	0.81304
M21_ECM_LE	-0.0328	0.14025	-0.23386	0.81525
M24_KNN_LE	-0.10673	0.22006	-0.48499	0.62804
M26_MAA_LE	-0.21141	0.15661	-1.34991	0.17808
M27_PAC_LE	-0.0435	0.20516	-0.21203	0.83223
M29_AM_LE	-0.03255	0.21429	-0.1519	0.87937
M33_SYA_LE	0.55914	0.13102	4.26744	0.00003
M17_JH				
(Intercept)	-1.50518	0.27397	-5.49397	0

M17_JH_log	-0.29415	0.09252	-3.17931	0.00163
FTFBMPM	0.08206	0.14256	0.5756	0.56533
M3_BIMB_LE	-0.24119	0.36162	-0.66698	0.50531
M4_HLF_LE	0.17603	0.33653	0.52307	0.60132
M7_MAL_LE	0.34687	0.51346	0.67555	0.49986
M11_RCE_LE	-0.06665	0.33728	-0.1976	0.8435
M12_OSK_LE	-0.13888	0.17301	-0.80273	0.42278
M14_APEX_LE	-0.40841	0.15538	-2.62847	0.00903
M16_HLC_LE	-0.11978	0.18242	-0.65662	0.51194
M19_ACS_LE	-0.49419	0.20505	-2.41015	0.01656
M22_HWA_LE	-0.19654	0.45938	-0.42784	0.66908
M24_KNN_LE	-0.27215	0.256	-1.06306	0.28863
M27_PAC_LE	-0.2263	0.42846	-0.52817	0.59778
M28_LPI_LE	0.53125	0.4917	1.08043	0.28084
M29_AM_LE	-0.70364	0.17956	-3.91862	0.00011
M32_MPHB_LE	-0.38544	0.62167	-0.62	0.53574
M18_KUD				
(Intercept)	-0.7686	0.45976	-1.67175	0.09562
M18_KUD_log	-0.24983	0.11259	-2.21897	0.02724
Budget_Balance_GDP	1.85524	1.95204	0.95041	0.34267
FTFBMPM	0.09098	0.0773	1.17695	0.24015
M3_BIMB_LE	-0.26538	0.09423	-2.81639	0.00518
M9_RHB_LE	-0.68557	0.16707	-4.10354	0.00005
M12_OSK_LE	-0.01332	0.1545	-0.08623	0.93134
M14_APEX_LE	0.06032	0.26565	0.22708	0.82051
M17_JH_LE	-0.30381	0.17312	-1.75499	0.08028
M24_KNN_LE	0.2179	0.14384	1.51492	0.13085
M27_PAC_LE	-0.62739	0.26717	-2.34825	0.01951
M19_ACS				
(Intercept)	7.66805	3.40791	2.25008	0.02518
M19_ACS_DE	-9.67899	3.61611	-2.67663	0.00785
M19_ACS_MM	8.45989	4.66721	1.81262	0.07091
M19_ACS_log	0.07144	0.0744	0.96026	0.33771
Budget_Balance_GDP	3.50283	2.48042	1.41219	0.15895
FTFBMPM	0.09459	0.12834	0.73703	0.46169
M6_CIM_LE	-0.02643	0.32948	-0.08023	0.93611
M9_RHB_LE	-0.06185	0.31684	-0.1952	0.84537
M14_APEX_LE	0.20382	0.14949	1.36344	0.17378
M17_JH_LE	-0.08193	0.08913	-0.91925	0.35871
M18_KUD_LE	-0.19576	0.23704	-0.82586	0.40955
M26_MAA_LE	-0.11327	0.19674	-0.57574	0.56523

M27_PAC_LE	-0.43086	0.18535	-2.32454	0.02078
M30_MHB_LE	-0.49382	0.2367	-2.08628	0.03781
M31_TIH_LE	-0.13764	0.1536	-0.89608	0.37094
M32_MPHB_LE	-0.16473	0.54188	-0.304	0.76134
M20_MB				
(Intercept)	2.38434	5.33633	0.44681	0.65534
M20_MB_MM	-39.4258	63.47894	-0.62108	0.53502
FBMKLCI_Index	-0.00203	0.00285	-0.71285	0.4765
CDS_USD	0.03721	0.72482	0.05134	0.95909
FTFBMPM	0.1866	0.13418	1.39062	0.16538
M2_AFF_LE	0.00496	0.38069	0.01304	0.9896
M3_BIMB_LE	-0.40464	0.34354	-1.17783	0.23981
M4_HLF_LE	0.14237	0.37034	0.38444	0.70093
M7_MAL_LE	-0.11293	0.59901	-0.18854	0.85059
M9_RHB_LE	-0.53818	0.28225	-1.90675	0.05752
M10_ALL_LE	-0.71706	0.48093	-1.49097	0.13703
M12_OSK_LE	-0.02397	0.23638	-0.10141	0.91929
M24_KNN_LE	-0.39965	0.31115	-1.28442	0.19999
M33_SYA_LE	-0.97794	0.66441	-1.47188	0.14211
M22_HWA				
(Intercept)	-0.83638	0.41656	-2.00786	0.04555
FTFBMPM	0.11555	0.12359	0.93492	0.35058
M2_AFF_LE	0.10234	0.16042	0.63798	0.52397
M3_BIMB_LE	-0.40285	0.23045	-1.74809	0.08147
M12_OSK_LE	-0.16429	0.12837	-1.27976	0.20162
M14_APEX_LE	0.09685	0.17195	0.56322	0.57371
M15_KAF_LE	0.10459	0.15085	0.69334	0.48863
M17_JH_LE	-0.06556	0.08805	-0.74458	0.45711
M24_KNN_LE	-0.13033	0.15449	-0.8436	0.39957
M26_MAA_LE	-0.09441	0.15817	-0.59691	0.55102
M28_LPI_LE	-0.29262	0.62057	-0.47152	0.63761
M23_ELK				
(Intercept)	-0.89868	0.31557	-2.84776	0.0047
M29_AM_LE	-0.95639	0.36883	-2.59305	0.00997
M27_PAC				
(Intercept)	4.18095	2.77893	1.50452	0.13353
M27_PAC_PBV	-5.86251	2.28106	-2.57008	0.01067
M27_PAC_log	-0.08504	0.12265	-0.69336	0.48864
FBMKLCI_Index	0.0007	0.00109	0.64057	0.52231
Budget_Balance_GDP	3.91012	2.13305	1.83311	0.06781
FTFBMPM	0.04121	0.09497	0.43389	0.66469

M3_BIMB_LE	0.03954	0.26163	0.15113	0.87998
M5_AMM_LE	0.02209	0.2053	0.10761	0.91438
M7_MAL_LE	-0.88014	0.44192	-1.99161	0.04735
M11_RCE_LE	-0.61997	0.19231	-3.22375	0.00141
M13_BUR_LE	-0.19056	0.66147	-0.28809	0.77348
M14_OSK_LE	0.04558	0.35711	0.12763	0.89853
M15_KAF_LE	-0.11079	0.31387	-0.35297	0.72436
M16_HLC_LE	-0.06996	0.22481	-0.31118	0.75589
M18_KUD_LE	-0.04367	0.22332	-0.19553	0.84511
M19_ACS_LE	0.02646	0.16042	0.16495	0.8691
M28_LPI_LE	0.23852	0.49654	0.48036	0.63133
M29_AM_LE	-0.03361	0.32659	-0.10291	0.91811
M30_MHB_LE	-0.3618	0.40415	-0.8952	0.37142
M33_SYA_LE	-0.26436	0.18224	-1.45062	0.14796
M28_LPI				
(Intercept)	-0.11084	0.34405	-0.32216	0.74756
M28_LPI_PBV	-0.09343	0.0639	-1.46221	0.14474
M28_LPI_log	0.18017	0.06902	2.61047	0.0095
FTFBMPM	0.07158	0.05779	1.23852	0.2165
M4_HLF_LE	-0.30629	0.15909	-1.9253	0.05514
M6_CIM_LE	-0.22839	0.20017	-1.14097	0.2548
M8_PUB_LE	0.06193	0.38869	0.15933	0.87352
M13_BUR_LE	-0.0868	0.36385	-0.23855	0.81162
M16_HLC_LE	-0.05106	0.19904	-0.25654	0.79771
M17_JH_LE	0.02666	0.06248	0.42668	0.66992
M22_HWA_LE	-0.29284	0.12508	-2.34122	0.01988
M24_KNN_LE	0.08839	0.0675	1.30949	0.19138
M33_SYA_LE	-0.13449	0.09939	-1.35313	0.17704
M32_MPHB				
(Intercept)	-0.09594	0.55639	-0.17244	0.86321
M32_MPHB_MM	-0.14798	2.3776	-0.06224	0.95042
M32_MPHB_PBV	-1.52745	0.14408	-10.6017	0
M32_MPHB_log	0.01492	0.10325	0.14451	0.88519
FBMKLCI_Index	0.00006	0.00037	0.17063	0.86463
FTFBMPM	-0.00098	0.02275	-0.04326	0.96552
M4_HLF_LE	-0.0018	0.06411	-0.02808	0.97761
M7_MAL_LE	-0.04826	0.13139	-0.36731	0.71366
M8_PUB_LE	-1.18687	0.3987	-2.97688	0.00316
M11_RCE_LE	0.01095	0.10221	0.10716	0.91473
M14_APEX_LE	-0.14548	0.40921	-0.3555	0.72247
M16_HLC_LE	0.01208	0.06345	0.19042	0.84911

M17_JH_LE	-0.02245	0.02881	-0.77918	0.43651
M19_ACS_LE	-0.00389	0.06528	-0.05964	0.95249
M25_PET_LE	-0.00182	1.18534	-0.00153	0.99878
M29_AM_LE	-0.09766	0.05245	-1.86202	0.0636
M30_MHB_LE	0.00119	0.05166	0.02301	0.98166
M31_TIH_LE	0.00494	0.49402	0.01	0.99203
M33_SYA_LE	-0.01156	0.07367	-0.1569	0.87544
M33_SYA				
(Intercept)	-2.02873	0.74575	-2.72038	0.00691
M33_SYA_PBV	0.29685	0.09359	3.17192	0.00167
M33_SYA_log	0.0416	0.0448	0.92851	0.3539
CDS_USD	-0.25948	0.37297	-0.69571	0.48716
Budget_Balance_GDP	-1.02644	1.8962	-0.54132	0.5887
FTFBMPM	0.11246	0.04908	2.29112	0.02266
M3_BIMB_LE	-0.07628	0.2178	-0.35025	0.7264
M6_CIM_LE	0.28094	0.09024	3.11315	0.00203
M8_PUB_LE	-0.09354	0.20685	-0.4522	0.65145
M15_KAF_LE	0.25136	0.19376	1.29729	0.19554
M19_ACS_LE	-0.40726	0.19355	-2.10418	0.03621
M20_MB_LE	-0.2445	0.05573	-4.38732	0.00002
M22_HWA_LE	0.03283	0.11049	0.29717	0.76654
M30_MHB_LE	-0.21839	0.17651	-1.23725	0.21698
M31_TIH_LE	-0.2861	0.12774	-2.23965	0.02586
M34_MANH				
(Intercept)	-1.20541	0.30221	-3.98865	0.00008
M34_MANH_log	-0.24509	0.0671	-3.65278	0.00031
FTFBMPM	0.10439	0.08973	1.16338	0.24559
M2_AFF_LE	-0.04516	0.15244	-0.29622	0.76726
M13_BUR_LE	-0.21004	0.22469	-0.93478	0.35064
M16_HLC_LE	-0.4654	0.07007	-6.64169	0
M23_ELK_LE	0.06744	0.33233	0.20293	0.83933

Bahrain

	Value	Std. Error	*t*-ratio	*p*-value
B1_AUB				
(Intercept)	1.76342	1.65899	1.06295	0.28866
B1_AUB_PBV	-0.80484	0.51121	-1.57437	0.11646
B1_AUB_log	0.24369	0.13908	1.75211	0.08078
BHSEASI	0.47634	0.18514	2.57285	0.01057
IMP_VOL	-0.06868	0.16181	-0.42443	0.67156
B3_BIB_LE	0.14494	0.39679	0.36528	0.71516

B6_TBB_LE	0.13308	0.18947	0.70236	0.483
B9_IB_LE	-0.0117	0.43772	-0.02673	0.97869
B10_ALB_LE	0.025	0.08167	0.30614	0.75971
B14_EI_LE	-253.984	221.9872	-1.14414	0.25348
B15_SAI_LE	1.09077	3.42192	0.31876	0.75013
B20_BK_LE	-0.16979	0.73827	-0.22999	0.81826
B2_AB				
(Intercept)	-2.59366	0.42971	-6.03578	0
BHSEASI	0.93823	0.22288	4.20967	0.00003
B4_BBK				
(Intercept)	3.23466	1.87606	1.72418	0.08568
B4_BBK_PBV	-3.30088	1.42567	-2.31531	0.02125
BHSEASI	0.18389	0.15824	1.16213	0.24609
B8_ASB_LE	-0.18616	0.10776	-1.7276	0.08507
B5_GFH				
(Intercept)	-3.31829	1.61871	-2.04996	0.04122
B5_PBV	-0.15738	0.36551	-0.43057	0.66709
BHSEASI	1.39202	0.60063	2.31761	0.02113
B2_ABC_LE	-2.08991	2.4329	-0.85902	0.391
B9_IB_LE	-4.44161	3.04634	-1.45802	0.14586
B7_UGB				
(Intercept)	2.33709	13.48271	0.17334	0.8625
B7_LEV	0.08696	0.60332	0.14414	0.88549
B7_DE	-0.02543	0.2402	-0.10588	0.91575
B7_MM	-0.65939	3.85581	-0.17101	0.86433
B7_PBV	-1.3305	2.56539	-0.51864	0.6044
B7_UGB_log	0.0877	0.26122	0.33575	0.7373
BHSEASI	0.16291	0.24698	0.65961	0.51002
B2_ABC_LE	0.02806	0.35264	0.07958	0.93662
B4_BBK_LE	-0.25754	0.39829	-0.64662	0.51838
B8_ASB_LE	-0.4735	0.34853	-1.35857	0.17532
B11_KHC_LE	0.04299	0.42114	0.10208	0.91877
B14_EI_LE	-444.045	391.1136	-1.13534	0.25716
B17_INVB_LE	-1.84442	0.80589	-2.28868	0.0228
B19_AHLINS_LE	-0.05374	0.67327	-0.07981	0.93644
B20_BK_LE	0.0271	0.52205	0.05191	0.95864
B9_IB				
(Intercept)	-2.23236	12.72434	-0.17544	0.86085
B9_DE	-0.0479	0.20792	-0.23037	0.81796
B9_MM	7.16781	12.49938	0.57345	0.56676
B9_PBV	-0.30534	0.47815	-0.63859	0.52357

BHSEASI	0.91129	0.22868	3.98498	0.00008
B3_BIB_LE	-0.75439	0.43897	-1.71854	0.08672
B7_UGB_LE	-0.52881	0.37812	-1.39854	0.16297
B20_BK_LE	0.26753	0.63924	0.41851	0.67587
B10_ALB				
(Intercept)	-2.29245	0.40408	-5.67319	0
BHSEASI	0.37688	0.1994	1.89003	0.05969
B4_BBK_LE	-0.06876	0.0632	-1.08804	0.27743
B11_KHC				
(Intercept)	-9.43589	6.0042	-1.57155	0.11715
B11_DE	0.20582	0.11732	1.75428	0.08044
B11_MM	28.4356	46.79314	0.60769	0.54387
B11_PBV	-47.4185	13.95429	-3.39813	0.00077
B11_KHC_log	-0.20324	0.10485	-1.93835	0.05355
BHSEASI	0.64916	0.31509	2.06025	0.04027
IMP_VOL	1.67582	0.42587	3.93504	0.0001
B23_ARINS_log	0.09202	0.94907	0.09695	0.92283
B1_AUB_LE	0.23684	0.44485	0.53241	0.59485
B3_BIB_LE	-0.3317	2.01172	-0.16488	0.86915
B4_BBK_LE	0.10882	0.20196	0.53883	0.59042
B6_TBB_LE	-0.04981	0.33118	-0.1504	0.88055
B7_UGB_LE	0.01318	0.20177	0.06533	0.94795
B9_IB_LE	-0.25688	0.48647	-0.52804	0.59788
B11_KHC_LE	0.44506	0.41951	1.0609	0.28962
B12_OB_LE	-2.40125	3.74102	-0.64187	0.52147
B13_BME_LE	0.32218	0.30259	1.06472	0.28789
B14_EI_LE	2470.301	901.2113	2.74109	0.00651
B15_SAI_LE	-17.6561	12.19005	-1.4484	0.14859
B16_UG_LE	-8.84009	18.87717	-0.4683	0.63993
B17_INVB_LE	0.70523	0.58326	1.20912	0.22761
B18_BCOM_LE	0.22202	0.83558	0.26571	0.79065
B12_OB				
(Intercept)	1389.422	685.5775	2.02664	0.04364
B12_size	-227.541	113.411	-2.00634	0.04578
B12_LEV	-6.45128	3.99731	-1.6139	0.10767
B12_DE	-0.27612	0.1532	-1.80239	0.07256
B12_MM	-107.504	23.98521	-4.48208	0.00001
B12_PBV	-9.08061	3.37966	-2.68684	0.00764
B12_OB_log	0.17847	0.10507	1.69861	0.0905
BA_POLICY_RATE	-89.925	53.40836	-1.68373	0.09335
BHSEASI	0.37255	0.10042	3.70981	0.00025

IMP_VOL	0.138	0.31818	0.43371	0.66483
B23_ARINS_log	0.08381	0.44986	0.18629	0.85235
B1_AUB_LE	0.03785	0.12085	0.31321	0.75436
B2_ABC_LE	0.0102	0.12915	0.07901	0.93708
B3_BIB_LE	0.13034	0.47262	0.27578	0.78292
B4_BBK_LE	0.07248	0.14705	0.4929	0.62247
B6_TBB_LE	0.14349	0.08406	1.70711	0.08891
B7_UGB_LE	0.01313	0.02123	0.61862	0.53666
B8_ASB_LE	0.03682	0.06606	0.5573	0.57776
B9_IB_LE	-0.00481	0.15974	-0.03009	0.97602
B10_ALB_LE	-0.0733	0.06004	-1.22093	0.22313
B12_OB_LE	3.205	29.1165	0.11008	0.91243
B13_BME_LE	0.09983	0.11402	0.87553	0.38203
B14_EI_LE	-137.908	292.2358	-0.4719	0.63736
B15_SAI_LE	-0.89265	4.8616	-0.18361	0.85445
B16_UG_LE	0.05042	0.54109	0.09318	0.92583
B17_INVB_LE	0.07886	0.29159	0.27043	0.78703
B18_BCOM_LE	-0.01682	0.13021	-0.12921	0.89728
B19_AHLINS_LE	-0.10135	0.22133	-0.45793	0.64736
B20_BK_LE	0.02479	0.1107	0.22396	0.82295
B21_BO_LE	0.3939	49.26347	0.008	0.99363
B13_BME				
(Intercept)	0.00002	0.00304	0.0062	0.99506
B13_DE	0	0.00005	0.00001	0.99999
B13_PBV	0	0.00314	-0.00015	0.99988
B13_BME_log	1.01771	0.00964	105.6125	0
B18_BCOM_LE	0	0.14678	0	1
B14_EI				
(Intercept)	5.63238	4.15986	1.35398	0.17674
B14_PBV	-7.2539	3.56022	-2.03749	0.04246
IMP_VOL	-0.19927	0.30577	-0.65169	0.51509
B3_BIB_LE	-1.32447	0.59106	-2.24083	0.02575
B15_SAI_LE	-20.7229	5.73412	-3.61397	0.00035

Pakistan				
	Value	Std. Error	*t*-ratio	*p*-value
P1_COM				
(Intercept)	-9.06633	10.42486	-0.86968	0.38519
P1_COM_PBV	1.09839	1.19452	0.91953	0.35858
P1_COM_LEV	-0.06992	0.07865	-0.88894	0.37477
P1_COM_log	-0.01691	0.13651	-0.12388	0.9015

Pakistan_Index	0.07923	0.07984	0.99227	0.32189
KSE_VOL	0.021	0.03234	0.64924	0.51669
PK_INT_RESV	1.86992	2.34995	0.79573	0.42683
P2_AB_LE	0.22848	0.1707	1.33847	0.18178
P4_HMB_LE	-0.49827	0.17397	-2.86404	0.00448
P5_OBP_LE	0.20833	0.18248	1.1416	0.25455
P6_MBL_LE	-0.26891	0.20155	-1.33422	0.18317
P7_BAL_LE	-0.02334	0.1722	-0.13557	0.89226
P8_UB_LE	-0.37123	0.1026	-3.61821	0.00035
P9_ALB_LE	-0.14032	0.22101	-0.6349	0.52599
P13_MCB_LE	0.09202	0.18351	0.50146	0.61643
P14_NIB_LE	-0.12975	0.12135	-1.06918	0.28587
P17_HB_LE	-0.14564	0.16622	-0.87619	0.38165
P20_FBL_LE	-0.25562	0.13115	-1.94917	0.05223
P2_AB				
(Intercept)	4.4869	6.44428	0.69626	0.48682
P2_AB_PBV	-1.7515	0.89043	-1.96703	0.05012
P2_AB_LEV	-0.20207	0.31303	-0.64553	0.51909
P2_AB_log	-0.10156	0.12753	-0.79638	0.42646
Pakistan_Index	0.01096	0.12182	0.08998	0.92836
P1_COM_LE	0.3289	0.61171	0.53767	0.59121
P3_SB_LE	-0.19622	0.16338	-1.20101	0.23072
P4_HMB_LE	-0.39465	0.19364	-2.03806	0.04244
P6_MBL_LE	-0.33857	0.32982	-1.02653	0.30549
P7_BAL_LE	-0.22253	0.40433	-0.55037	0.58248
P9_ALB_LE	0.2779	0.50396	0.55144	0.58175
P10_BOP_LE	-0.45521	0.2245	-2.02763	0.0435
P13_MCB_LE	0.06898	0.32396	0.21294	0.83152
P14_NIB_LE	-0.49442	0.24557	-2.0133	0.045
P16_SC_LE	0.06776	0.33629	0.20149	0.84045
P17_HB_LE	-0.41172	0.61637	-0.66796	0.50468
P19_SIL_LE	0.18794	0.19119	0.983	0.32642
P20_FBL_LE	-0.13276	0.3338	-0.39771	0.69113
P3_SB				
(Intercept)	-74.468	54.09947	-1.3765	0.16975
P3_SB_PBV	-7.73145	2.96974	-2.60341	0.00971
P3_SB_size	11.14041	7.04498	1.58133	0.11491
P3_SB_LEV	-1.52501	1.26878	-1.20194	0.23038
P3_SB_DE	1.74311	0.93879	1.85677	0.06438
P3_SB_log	0.0086	0.11958	0.07193	0.94271
Pakistan_Index	-0.02301	0.12127	-0.1897	0.84968

KSE_VOL	0.12598	0.11004	1.14485	0.25323
PK_TBILL_RATE	-0.25785	0.43952	-0.58667	0.55789
PK_10Y_BOND	0.39683	0.72815	0.54498	0.58619
PK_POLICY_RATE	0.05197	0.46171	0.11255	0.91046
PK_INT_RESV	3.37499	4.60592	0.73275	0.46431
P1_COM_LE	0.33072	0.84911	0.38949	0.6972
P2_AB_LE	-0.05583	0.37783	-0.14777	0.88263
P4_HMB_LE	0.0218	0.25296	0.08618	0.93139
P5_OBP_LE	-0.39106	0.44598	-0.87686	0.3813
P6_MBL_LE	-0.8129	0.27875	-2.91623	0.00382
P8_UB_LE	0.3315	0.4663	0.71091	0.47772
P9_ALB_LE	0.09162	0.65307	0.14029	0.88853
P10_BOP_LE	-0.30341	0.23253	-1.30481	0.19301
P13_MCB_LE	-0.08049	0.51047	-0.15768	0.87482
P14_NIB_LE	-0.03018	0.27209	-0.11092	0.91176
P16_SC_LE	-0.80665	0.27229	-2.9625	0.00331
P17_HB_LE	0.0135	0.46663	0.02894	0.97693
P19_SIL_LE	0.03278	0.25519	0.12846	0.89788
P20_FBL_LE	-0.74351	0.32581	-2.28206	0.02322
P4_HMB				
(Intercept)	-57.9307	55.05217	-1.05229	0.29356
P4_HMB_PBV	-2.39449	2.63	-0.91045	0.36335
P4_HMB_size	8.37508	7.09551	1.18033	0.23885
P4_HMB_DE	-0.51951	2.42681	-0.21407	0.83064
P4_HMB_MM	5.90042	21.63565	0.27272	0.78527
P4_HMB_log	-0.1604	0.16572	-0.96792	0.33391
Pakistan_Index	0.12385	0.11502	1.07676	0.2825
KSE_VOL	0.04694	0.14008	0.33507	0.73782
PK_TBILL_RATE	-0.35775	0.49611	-0.72111	0.47143
PK_10Y_BOND	0.13086	0.35281	0.37092	0.71098
PK_POLICY_RATE	0.09023	0.3631	0.2485	0.80393
PK_INT_RESV	-1.17058	2.10182	-0.55694	0.57801
P1_COM_LE	-0.75205	0.34701	-2.16724	0.03104
P2_AB_LE	-0.20315	0.21909	-0.92725	0.35458
P3_SB_LE	0.05517	0.27727	0.19899	0.84241
P5_OBP_LE	-0.04783	0.30739	-0.15559	0.87646
P6_MBL_LE	0.1142	0.37779	0.30227	0.76266
P7_BAL_LE	-0.06492	0.3106	-0.20903	0.83458
P8_UB_LE	-0.07882	0.3944	-0.19984	0.84175
P10_BOP_LE	-0.04481	0.20712	-0.21632	0.82889
P13_MCB_LE	-0.0803	0.38334	-0.20946	0.83424

P14_NIB_LE	0.46167	0.19933	2.31608	0.02126
P16_SC_LE	-0.41913	0.31107	-1.34737	0.17893
P17_HB_LE	-0.0917	0.44056	-0.20815	0.83526
P19_SIL_LE	-0.37931	0.37938	-0.99981	0.31825
P20_FBL_LE	0.11508	0.2352	0.4893	0.625
P5_OBP				
(Intercept)	-0.51598	0.46622	-1.10674	0.26929
P4_HMB_LE	-0.23689	0.26751	-0.88554	0.37657
P7_BAL_LE	-0.93103	0.34646	-2.68729	0.0076
P8_UB_LE	-0.17839	0.14184	-1.25774	0.20946
P9_ALB_LE	0.07821	0.36864	0.21217	0.83212
P13_MCB_LE	-0.22437	0.25956	-0.86442	0.38804
P16_SC_LE	-0.64721	0.39089	-1.65575	0.09882
P17_HB_LE	0.1342	0.39676	0.33823	0.73542
P19_SIL_LE	-0.21437	0.1852	-1.1575	0.24799
P20_FBL_LE	-0.0288	0.2557	-0.11264	0.91039
P6_MBL				
(Intercept)	-1.31757	0.21761	-6.05476	0
P1_COM_LE	-0.06324	0.21183	-0.29857	0.76547
P7_BAL_LE	-0.2783	0.02598	-10.7118	0
P9_ALB_LE	-0.28278	0.14697	-1.92404	0.05528
P13_MCB_LE	-0.03963	0.09605	-0.41261	0.68018
P7_BAL				
(Intercept)	-0.55676	1.06187	-0.52433	0.60045
P7_BAL_DE	0.06781	0.11793	0.57499	0.56574
P7_BAL_log	-0.08576	0.04903	-1.74929	0.08129
KSE_VOL	-0.00171	0.06373	-0.0269	0.97856
P1_COM_LE	-0.22944	0.21203	-1.08214	0.28008
P2_AB_LE	0.02577	0.14617	0.17634	0.86015
P3_SB_LE	0.05331	0.12089	0.44095	0.65958
P4_HMB_LE	-0.03436	0.06677	-0.51452	0.60728
P5_OBP_LE	-0.82273	0.23595	-3.48684	0.00056
P6_MBL_LE	-0.49131	0.33915	-1.44865	0.14851
P8_UB_LE	-0.15225	0.24989	-0.60926	0.54283
P9_ALB_LE	-0.0678	0.24537	-0.2763	0.78251
P10_BOP_LE	-0.14272	0.08275	-1.72458	0.08566
P13_MCB_LE	0.23101	0.25777	0.89619	0.37089
P14_NIB_LE	-0.13547	0.11824	-1.14568	0.25286
P16_SC_LE	-0.21795	0.16814	-1.29623	0.19591
P17_HB_LE	-0.23409	0.26304	-0.88993	0.37423
P20_FBL_LE	-0.08735	0.10238	-0.85318	0.39426

P8_UB				
(Intercept)	15.69103	7.87579	1.99231	0.04726
P8_UB_PBV	-2.18695	1.12211	-1.94897	0.05224
P8_UB_DE	1.29208	1.60101	0.80704	0.42029
P8_UB_log	-0.02666	0.09497	-0.28072	0.77912
PK_INT_RESV	-3.49941	1.91047	-1.83169	0.068
P1_COM_LE	-0.39952	0.22047	-1.81213	0.07098
P3_SB_LE	0.12265	0.16134	0.76019	0.44775
P4_HMB_LE	-0.37585	0.21511	-1.74725	0.08163
P5_OBP_LE	-0.27013	0.11751	-2.29876	0.02222
P7_BAL_LE	0.01107	0.21705	0.05101	0.95935
P9_ALB_LE	-0.04486	0.35533	-0.12624	0.89963
P10_BOP_LE	-0.16798	0.21646	-0.77602	0.43836
P13_MCB_LE	-0.22209	0.48251	-0.46027	0.64566
P14_NIB_LE	-0.16993	0.14167	-1.1995	0.23129
P17_HB_LE	-0.74311	0.42628	-1.74324	0.08233
P9_ALB				
(Intercept)	12.50305	5.66861	2.20566	0.02818
P9_ALB_PBV	0.19923	0.21672	0.9193	0.35869
P9_ALB_size	-0.72744	0.49811	-1.46039	0.14524
P9_ALB_log	-0.18263	0.04506	-4.05326	0.00006
PK_INT_RESV	-1.91946	0.68277	-2.81127	0.00526
P1_COM_LE	-0.70604	0.15674	-4.50447	0.00001
P6_MBL_LE	-0.02474	0.10184	-0.24288	0.80826
P7_BAL_LE	-0.15667	0.09726	-1.61078	0.10829
P8_UB_LE	-0.34409	0.09636	-3.57099	0.00041
P10_BOP_LE	0.07187	0.07575	0.94876	0.34351
P13_MCB_LE	-0.12391	0.09891	-1.2528	0.21127
P14_NIB_LE	-0.03047	0.11055	-0.2756	0.78304
P16_SC_LE	0.03406	0.08031	0.42415	0.67177
P17_HB_LE	-0.17263	0.23522	-0.73392	0.46358
P20_FBL_LE	-0.0839	0.07517	-1.11606	0.2653
P16				
(Intercept)	4.15E+00	5.39E+00	7.70E-01	0.44
P16_SC_DE	1.47E+01	6.27E+00	2.34E+00	0.02
PK_POLICY_RATE	1.03E-01	2.89E-01	3.58E-01	0.72
PK_INT_RESV	-3.18	1.88E+00	-1.69E+00	0.09
P3_SB_LE	-0.26	1.33E-01	-1.95E+00	0.05
P6_MBL_LE	0.13	2.00E-01	6.69E-01	0.50
P9_ALB_LE	-0.64	1.73E-01	-3.68E+00	0.00
P17_HB_LE	-0.15	2.82E-01	-5.18E-01	0.61

P19_SIL_LE	-0.30	1.19E-01	-2.50E+00	0.01

Oman				
	Value	Std. Error	*t*-ratio	*p*-value
O1_OT				
(Intercept)	-24.7268	20.17221	-1.22579	0.22128
O1_OT_PBV	2.4667	1.41485	1.74343	0.08232
O1_OT_size	3.74253	3.53256	1.05944	0.29028
O1_OT_MM	2.46645	6.20858	0.39726	0.69147
O1_OT_log	-0.18056	0.10204	-1.76949	0.07787
Muscat_Securities_MSM_30_Index	-0.02895	0.11647	-0.24858	0.80386
O2_DHO_LE	-0.30667	0.20981	-1.46166	0.14492
O3_SOH_LE	0.04529	0.09851	0.45978	0.64602
O5_HSBC_LE	-0.06121	0.1434	-0.42685	0.6698
O6_MUS_LE	-0.71468	0.25066	-2.85114	0.00467
O7_FIN_LE	0.01846	0.05783	0.31921	0.7498
O9_MUS_LE	-0.1312	0.20195	-0.64968	0.51641
O11_ANW_LE	-0.00207	0.08178	-0.02526	0.97987
O13_OEH_LE	0.01258	0.08104	0.15526	0.87673
O16_UF_LE	-0.31543	0.10195	-3.09409	0.00217
O18_OFC_LE	-0.23376	0.16174	-1.44526	0.14947
O19_AMF_LE	-0.34427	0.38544	-0.89317	0.37251
O20_SHQ_LE	0.2122	0.896	0.23683	0.81295
O21_TFC_LE	0.06034	0.11453	0.52685	0.5987
O22_TAG_LE	-0.04383	0.21652	-0.20241	0.83974
O24_OOL_LE	0.16963	0.14365	1.18082	0.23864
O26_DHO_LE	0.10749	0.21545	0.4989	0.61823
O2_DHO				
(Intercept)	-2.07672	0.6323	-3.28439	0.00114
O2_DHO_PBV	0.24616	0.34909	0.70515	0.48127
O2_DHO_log	-0.00622	0.13461	-0.04617	0.9632
Muscat_Securities_MSM_30_Index	0.22333	0.15237	1.46577	0.14377
O1_OT_LE	-0.27956	0.18491	-1.51188	0.13162
O6_MUS_LE	0.00297	0.24957	0.01192	0.9905
O10_SEC_LE	0.02355	0.39147	0.06017	0.95206
O16_UF_LE	0.20127	0.11927	1.68749	0.09256
O22_TAG_LE	-0.20812	0.08808	-2.36273	0.01878
O25_OI_LE	-0.0858	0.39752	-0.21585	0.82926
O26_DHO_LE	-0.31333	0.26439	-1.18511	0.23692
O27_DHOIS_LE	-0.09375	0.09464	-0.99067	0.32265
O29_OUI_LE	0.00677	0.10295	0.06572	0.94764

O3_SOH				
(Intercept)	-1.02228	0.59993	-1.70399	0.08942
O3_SOH_log	-0.27053	0.13976	-1.9356	0.05386
O1_OT_LE	-0.71418	0.45383	-1.57365	0.11663
O6_MUS_LE	-0.62063	0.33112	-1.87433	0.06186
O8_BAT_LE	-0.18528	0.11497	-1.61151	0.10813
O11_ANW_LE	0.21153	0.15754	1.34275	0.18038
O13_OEH_LE	-0.30904	0.13882	-2.22625	0.02675
O14_OI_LE	0.01814	0.23311	0.07782	0.93802
O16_UF_LE	0.1326	0.15447	0.85844	0.39134
O17_AB_LE	-0.17387	0.13082	-1.32906	0.18485
O18_OFC_LE	-0.42018	0.23415	-1.79452	0.07374
O23_GINV_LE	-0.08149	0.16508	-0.49363	0.62193
O29_OUI_LE	-0.17772	0.19289	-0.92132	0.35763
O4_NIZ				
(Intercept)	-1.27928	0.5477	-2.33574	0.02017
O4_NIZ_log	-0.31918	0.10297	-3.09969	0.00212
Muscat_Securities_MSM_30_Index	-0.35091	0.21473	-1.63423	0.10326
O2_DHO_LE	-0.64332	0.32947	-1.95261	0.0518
O5_HSBC_LE	0.27528	0.21786	1.26354	0.20738
O8_BAT_LE	-0.2879	0.28469	-1.01127	0.31271
O11_ANW_LE	0.08905	0.16399	0.54301	0.58753
O12_MADI_LE	-0.05814	0.23989	-0.24238	0.80865
O13_OEH_LE	-0.7001	0.1969	-3.5556	0.00044
O21_TFC_LE	-0.30353	0.18975	-1.59964	0.11073
O23_GINV_LE	-0.43646	0.1424	-3.06506	0.00237
O29_OUI_LE	0.19792	0.27512	0.71939	0.47246
O5_HSBC				
(Intercept)	-2.36644	0.26042	-9.08687	0
O5_HSBC_log	-0.17111	0.09275	-1.8448	0.06606
O1_OT_LE	-1.0197	0.33288	-3.06323	0.00239
O2_DHO_LE	0.18132	0.12895	1.40616	0.16072
O4_NIZ_LE	-0.30122	0.42628	-0.70663	0.48035
O8_BAT_LE	0.07638	0.0603	1.26659	0.20629
O12_MADI_LE	0.08084	0.10539	0.76701	0.44369
O13_OEH_LE	0.12517	0.13976	0.89561	0.37119
O17_AB_LE	-0.02831	0.11908	-0.23772	0.81227
O19_AMF_LE	0.40892	0.07162	5.70959	0
O23_GINV_LE	-0.36969	0.10073	-3.67007	0.00029
O24_OOL_LE	0.17635	0.07343	2.4015	0.01694
O25_OI_LE	-0.1754	0.19087	-0.91892	0.35888

O27_DHOIS_LE	-0.17484	0.13962	-1.25222	0.21147
O6_MUS				
(Intercept)	-1.19905	0.77324	-1.55069	0.12203
O6_MUS_PBV	0.31317	0.65111	0.48098	0.63088
O1_OT_LE	-0.38834	0.2032	-1.91114	0.05694
O3_SOH_LE	0.00218	0.11289	0.01933	0.98459
O13_OEH_LE	0.05732	0.07293	0.78594	0.43252
O14_OI_LE	-0.14405	0.1629	-0.88427	0.37726
O16_UF_LE	0.02678	0.08897	0.30095	0.76366
O17_AB_LE	-0.14327	0.18411	-0.77816	0.43709
O23_GINV_LE	-0.17742	0.10741	-1.65174	0.09964
O25_OI_LE	-0.28421	0.19096	-1.48834	0.13771
O26_DHO_LE	-0.4794	0.23875	-2.00795	0.04555
O29_OUI_LE	-0.02399	0.16389	-0.14636	0.88374
O7_FIN				
(Intercept)	-1.89706	7.18233	-0.26413	0.79187
O7_FIN_PBV	2.80607	0.64965	4.31938	0.00002
O7_FIN_LEV	-4.57094	3.99315	-1.14469	0.25326
O7_FIN_log	-0.09564	0.3016	-0.31712	0.75138
Muscat_Securities_MSM_30_Index	-0.49259	0.30227	-1.62961	0.10425
MSM30_VOL	0.08689	0.07404	1.17359	0.2415
O1_OT_LE	-0.35285	0.50436	-0.6996	0.48473
O9_MUS_LE	-0.23222	0.29991	-0.7743	0.43937
O10_SEC_LE	0.02468	0.45934	0.05373	0.95719
O14_OI_LE	-0.14638	0.4165	-0.35145	0.7255
O15_GF_LE	-0.09408	0.26027	-0.36149	0.71799
O16_UF_LE	-0.42101	0.5794	-0.72662	0.46803
O17_AB_LE	0.11989	0.38066	0.31496	0.75301
O18_OFC_LE	0.39408	0.39176	1.00591	0.31528
O25_OI_LE	-0.51536	0.58141	-0.88639	0.37613
O26_DHO_LE	0.28476	0.51457	0.5534	0.58041
O8_BAT				
(Intercept)	-5.03756	1.54084	-3.26937	0.00121
O8_BAT_PBV	1.77375	0.92578	1.91596	0.05635
O8_BAT_MM	-0.71718	3.14689	-0.2279	0.81988
O8_BAT_log	-0.46094	0.07839	-5.87989	0
Repo_Rate	1.61361	1.51326	1.06631	0.28717
Muscat_Securities_MSM_30_Index	0.43602	0.17823	2.44644	0.01502
O1_OT_LE	0.27594	0.46139	0.59805	0.55027
O3_SOH_LE	-0.0911	0.44927	-0.20278	0.83945
O4_NIZ_LE	-0.14311	0.61297	-0.23348	0.81556

O9_MUS_LE	0.08406	0.1694	0.49622	0.62011
O10_SEC_LE	-0.26753	0.15187	-1.76151	0.07921
O12_MADI_LE	-0.37845	0.19997	-1.89257	0.05941
O13_OEH_LE	-0.19275	0.26099	-0.73854	0.46078
O14_OI_LE	0.13271	0.32712	0.40568	0.68528
O15_GF_LE	-0.1895	0.16924	-1.11967	0.26378
O17_AB_LE	0.08474	0.37203	0.22778	0.81998
O19_AMF_LE	0.45331	0.44601	1.01637	0.3103
O22_TAG_LE	0.1755	0.04847	3.62056	0.00035
O23_GINV_LE	-0.07354	0.24042	-0.30587	0.75993
O27_DHOIS_LE	-0.69988	0.38668	-1.81	0.07133
O29_OUI_LE	0.14068	0.33696	0.41749	0.67663
O9_MUS				
(Intercept)	-194.131	165.2426	-1.17483	0.24105
O9_MUS_PBV	16.49836	7.8412	2.10406	0.03625
O9_MUS_size	38.97365	41.12622	0.94766	0.34411
O9_MUS_LEV	-0.28525	6.51261	-0.0438	0.9651
O9_MUS_log	-0.30343	0.28451	-1.06653	0.28709
Muscat_Securities_MSM_30_Index	-0.06076	0.21557	-0.28185	0.77826
O1_OT_LE	-0.2396	0.45652	-0.52483	0.60011
O2_DHO_LE	0.04711	0.35541	0.13254	0.89465
O5_HSBC_LE	-0.03794	0.37538	-0.10107	0.91956
O7_FIN_LE	0.09667	0.30083	0.32134	0.74819
O8_BAT_LE	0.06545	0.11355	0.57637	0.56482
O12_MADI_LE	0.16071	0.15267	1.05268	0.29338
O13_OEH_LE	0.03951	0.18517	0.21335	0.83121
O15_GF_LE	0.11685	0.18402	0.63497	0.52596
O16_UF_LE	0.14453	0.32016	0.45144	0.65202
O17_AB_LE	0.05231	0.32483	0.16105	0.87217
O18_OFC_LE	0.16841	0.32152	0.52379	0.60083
O19_AMF_LE	-0.09751	0.82059	-0.11883	0.9055
O20_SHQ_LE	-5.71225	6.0231	-0.94839	0.34374
O21_TFC_LE	0.06412	0.23454	0.27337	0.78477
O23_GINV_LE	0.17549	0.16719	1.04969	0.29475
O24_OOL_LE	-0.70112	0.44706	-1.56829	0.11793
O25_OI_LE	-0.63102	0.32196	-1.9599	0.05098
O26_DHO_LE	0.25411	0.39448	0.64418	0.51998
O27_DHOIS_LE	-0.38246	0.22516	-1.69857	0.0905
O28_MUH_LE	0.30738	0.20299	1.51427	0.13107
O29_OUI_LE	-0.39724	0.14045	-2.82839	0.00501
O10_SEC				

(Intercept)	-4.00592	1.61478	-2.48079	0.01366
O10_SEC_LEV	0.04523	1.04001	0.04349	0.96534
O10_SEC_DE	0.4237	2.22708	0.19025	0.84924
O10_SEC_log	-0.37216	0.10566	-3.52226	0.00049
Repo_Rate	-4.78702	0.92094	-5.19798	0
O9_MUS_LE	0.21072	0.07985	2.63887	0.00875
O15_GF_LE	0.22112	0.11322	1.95291	0.05176
O16_UF_LE	-0.14931	0.10709	-1.39434	0.16425
O17_AB_LE	-0.58341	0.25623	-2.27687	0.0235
O18_OFC_LE	0.22858	0.12901	1.77179	0.07745
O25_OI_LE	-0.16844	0.47	-0.35839	0.7203
O28_MUH_LE	0.78503	0.04923	15.94744	0
O11_ANW				
(Intercept)	-0.63447	1.13426	-0.55937	0.57634
O11_ANW_MM	2.72512	8.47398	0.32159	0.748
O11_ANW_log	-0.23011	0.11457	-2.00854	0.04551
Muscat_Securities_MSM_30_Index	0.00063	0.20072	0.00314	0.9975
MSM30_VOL	-0.11454	0.10792	-1.06137	0.28941
O1_OT_LE	-0.47744	0.49445	-0.9656	0.33505
O3_SOH_LE	-0.45497	0.28837	-1.57772	0.11572
O6_MUS_LE	-0.44866	0.52551	-0.85376	0.39394
O12_MADI_LE	-0.13257	0.14732	-0.89991	0.36891
O13_OEH_LE	0.23071	0.21435	1.07635	0.28267
O14_OI_LE	-0.598	0.37907	-1.57752	0.11576
O15_GF_LE	-0.15215	0.22933	-0.66348	0.50755
O16_UF_LE	-0.00057	0.21264	-0.0027	0.99784
O17_AB_LE	-0.4682	0.30231	-1.54875	0.12253
O20_SHQ_LE	1.37577	1.35345	1.01649	0.31024
O21_TFC_LE	0.06017	0.30788	0.19544	0.84518
O22_TAG_LE	0.00623	0.378	0.01647	0.98687
O23_GINV_LE	-0.34353	0.23929	-1.43563	0.15219
O24_OOL_LE	0.16818	0.19904	0.84494	0.39884
O27_DHOIS_LE	-0.26911	0.40623	-0.66245	0.50821
O29_OUI_LE	0.32988	0.28549	1.15548	0.24885
O12_MADI				
(Intercept)	-4.62465	4.59616	-1.0062	0.31516
O12_MADI_size	0.25572	1.02142	0.25036	0.80249
O12_MADI_log	-0.44224	0.22679	-1.94998	0.05214
Muscat_Securities_MSM_30_Index	0.07579	0.32825	0.23091	0.81755
O3_SOH_LE	-0.55627	0.633	-0.87878	0.38025
O5_HSBC_LE	-0.01949	0.909	-0.02144	0.98291

O6_MUS_LE	-0.5016	0.94216	-0.53239	0.59486
O8_BAT_LE	-0.22091	0.3474	-0.63589	0.52535
O11_ANW_LE	-0.42271	0.45892	-0.92109	0.35777
O13_OEH_LE	0.0901	0.55468	0.16243	0.87108
O14_OI_LE	-0.0875	0.41665	-0.21002	0.8338
O15_GF_LE	0.35741	0.50188	0.71215	0.47694
O16_UF_LE	0.31043	0.68154	0.45549	0.6491
O18_OFC_LE	-0.40227	0.62584	-0.64277	0.52088
O19_AMF_LE	0.21398	0.73547	0.29094	0.7713
O20_SHQ_LE	1.78276	2.25944	0.78903	0.43074
O24_OOL_LE	0.03844	0.2644	0.14537	0.88452
O25_OI_LE	-0.10265	0.97542	-0.10524	0.91626
O26_DHO_LE	-1.24502	0.75453	-1.65006	0.10001
O29_OUI_LE	0.11023	0.61819	0.17831	0.8586
O13_OEH				
(Intercept)	-2.72561	0.3662	-7.44293	0
O13_OEH_log	-0.04795	0.08294	-0.57813	0.56361
Muscat_Securities_MSM_30_Index	0.38627	0.13653	2.82918	0.00498
O3_SOH_LE	0.10919	0.2244	0.48657	0.62692
O4_NIZ_LE	-0.25001	0.27465	-0.91027	0.36342
O6_MUS_LE	-0.23288	0.29365	-0.79307	0.42837
O9_MUS_LE	0.08168	0.36407	0.22435	0.82264
O11_ANW_LE	-0.21234	0.15911	-1.33454	0.18305
O14_OI_LE	-0.69131	0.1989	-3.47572	0.00059
O15_GF_LE	-0.17402	0.10341	-1.68287	0.09345
O18_OFC_LE	0.47253	0.2215	2.13329	0.03372
O23_GINV_LE	-0.19375	0.09338	-2.07483	0.03886
O25_OI_LE	-0.22338	0.22822	-0.97879	0.32848
O29_OUI_LE	-0.00512	0.1164	-0.04402	0.96492
O14_OI				
(Intercept)	0	0.38028	0	1
O14_OI_size	-0.30763	0.0861	-3.57293	0.00041
O14_OI_MM	-2.28651	2.3007	-0.99383	0.32113
O14_OI_log	-0.15313	0.04914	-3.11612	0.00202
O2_DHO_LE	-0.0532	0.14029	-0.37922	0.7048
O3_SOH_LE	-0.03929	0.14269	-0.27537	0.78323
O6_MUS_LE	-0.30134	0.28222	-1.06776	0.28652
O7_FIN_LE	-0.24145	0.0907	-2.6622	0.0082
O8_BAT_LE	-0.05886	0.09231	-0.63763	0.52422
O9_MUS_LE	0.13449	0.29832	0.45083	0.65245
O11_ANW_LE	-0.09196	0.14101	-0.65213	0.51483

O12_MADI_LE	0.03995	0.08	0.4994	0.61788
O13_OEH_LE	-0.34554	0.08874	-3.89365	0.00012
O15_GF_LE	0	0.08204	0	1
O17_AB_LE	-0.17076	0.11551	-1.47827	0.14042
O19_AMF_LE	0.19014	0.14515	1.30992	0.19126
O20_SHQ_LE	0.67984	0.67794	1.00279	0.3168
O23_GINV_LE	-0.00472	0.20127	-0.02347	0.98129
O25_OI_LE	-0.23741	0.21552	-1.1016	0.27155
O27_DHOIS_LE	0.07216	0.15919	0.45331	0.65067
O29_OUI_LE	-0.36258	0.14655	-2.47408	0.01393
O15_GF				
(Intercept)	-3.74568	0.75098	-4.98772	0
O15_GF_log	-0.38777	0.16472	-2.35415	0.01921
O2_DHO_LE	0.81167	0.37427	2.16868	0.03089
O11_ANW_LE	-0.43954	0.28343	-1.55078	0.12201
O13_OEH_LE	0.05588	0.28876	0.19353	0.84668
O14_OI_LE	0.28523	0.45379	0.62856	0.53011
O17_AB_LE	-0.05432	0.64309	-0.08447	0.93274
O23_GINV_LE	0.04858	0.21372	0.22731	0.82034
O25_OI_LE	-0.67852	0.6063	-1.1191	0.26399
O29_OUI_LE	-0.49863	0.36492	-1.36641	0.17283
O16_UF				
(Intercept)	-2.71801	0.66557	-4.08376	0.00006
O16_UF_log	-0.406	0.17991	-2.25668	0.02474
O6_MUS_LE	-0.15189	0.5486	-0.27686	0.78207
O11_ANW_LE	-0.39211	0.2693	-1.45602	0.14642
O12_MADI_LE	-0.0018	0.11721	-0.01538	0.98774
O26_DHO_LE	-0.41481	0.61725	-0.67204	0.50207
O27_DHOIS_LE	-0.14834	0.25969	-0.57122	0.56827
O29_OUI_LE	-0.11822	0.50877	-0.23237	0.81641
O17_AB				
(Intercept)	-2.26463	1.33664	-1.69428	0.09127
O17_AB_PBV	-0.05255	0.9244	-0.05685	0.9547
O17_AB_log	-0.0275	0.1514	-0.18166	0.85597
Muscat_Securities_MSM_30_Index	0.10317	0.19215	0.53692	0.59173
O6_MUS_LE	-0.11121	0.4314	-0.25779	0.79675
O10_SEC_LE	-0.02285	0.17445	-0.13099	0.89587
O11_ANW_LE	0.02149	0.18713	0.11487	0.90863
O14_OI_LE	-0.12504	0.30972	-0.40373	0.6867
O16_UF_LE	-0.00472	0.20486	-0.02302	0.98165
O21_TFC_LE	0.03027	0.25797	0.11734	0.90667

O22_TAG_LE	-0.10217	0.1357	-0.75292	0.4521
O23_GINV_LE	-0.04864	0.21718	-0.22394	0.82296
O24_OOL_LE	0.11052	0.36907	0.29946	0.7648
O26_DHO_LE	-0.06531	0.30219	-0.21613	0.82903
O27_DHOIS_LE	-0.14868	0.37128	-0.40046	0.68911
O29_OUI_LE	0.07056	0.23809	0.29635	0.76717
O18_OFC				
(Intercept)	-11.6591	3.63014	-3.21174	0.00146
O18_OFC_PBV	9.06002	3.44541	2.62959	0.00899
O18_OFC_log	-0.35021	0.23761	-1.47388	0.14155
O7_FIN_LE	-0.02589	0.46212	-0.05602	0.95536
O12_MADI_LE	-0.10583	0.11483	-0.92163	0.35746
O16_UF_LE	-0.55484	0.58238	-0.95271	0.3415
O17_AB_LE	0.13318	0.40635	0.32776	0.74332
O21_TFC_LE	0.02858	0.23838	0.11989	0.90465
O19_AMF				
(Intercept)	-3.72653	37.70394	-0.09884	0.92134
O19_AMF_PBV	11.0609	3.68972	2.99776	0.00297
O19_AMF_size	-7.50041	9.39185	-0.79861	0.4252
O19_AMF_LEV	9.17206	3.31856	2.76387	0.0061
O19_AMF_MM	-40.6672	19.15099	-2.1235	0.0346
O19_AMF_log	-0.47154	0.20584	-2.29076	0.02273
Repo_Rate	6.91961	3.95097	1.75137	0.08099
Muscat_Securities_MSM_30_Index	0.0029	0.1459	0.01985	0.98418
MSM30_VOL	0.03499	0.0836	0.41849	0.67592
O1_OT_LE	-0.26937	0.31506	-0.85499	0.3933
O2_DHO_LE	-0.08684	0.31224	-0.27814	0.78112
O3_SOH_LE	-0.0431	0.36101	-0.11939	0.90506
O4_NIZ_LE	-0.02421	0.29759	-0.08136	0.93521
O5_HSBC_LE	0.02361	0.21193	0.11138	0.91139
O7_FIN_LE	-0.06132	0.17214	-0.35623	0.72194
O8_BAT_LE	0.04921	0.1033	0.47636	0.63419
O9_MUS_LE	0.14256	0.08783	1.62324	0.10568
O10_SEC_LE	0.15479	0.20603	0.7513	0.45311
O11_ANW_LE	0.10944	0.21957	0.49842	0.61859
O12_MADI_LE	0.08689	0.14931	0.58192	0.56109
O13_OEH_LE	-0.04078	0.14888	-0.27389	0.78437
O14_OI_LE	0.07089	0.34778	0.20383	0.83864
O15_GF_LE	-0.01007	0.16167	-0.0623	0.95037
O16_UF_LE	-0.11537	0.23932	-0.48208	0.63013
O17_AB_LE	0.09979	0.35574	0.28052	0.77929

O18_OFC_LE	-0.07582	0.23742	-0.31936	0.7497
O20_SHQ_LE	0.77895	1.55859	0.49978	0.61763
O21_TFC_LE	0.04311	0.2998	0.1438	0.88577
O22_TAG_LE	0.10572	0.19229	0.5498	0.5829
O24_OOL_LE	0.09912	0.25436	0.38971	0.69706
O25_OI_LE	0.09286	0.43033	0.21579	0.82931
O26_DHO_LE	-0.12716	0.22677	-0.56074	0.57543
O27_DHOIS_LE	0.08585	0.22956	0.37398	0.70871
O28_MUH_LE	0.06939	0.48396	0.14337	0.8861
O29_OUI_LE	-0.25049	0.30164	-0.83044	0.40701
O20_SHQ				
(Intercept)	-0.00742	0.00055	-13.6106	0
O20_SHQ_size	0.00181	0.00015	12.13558	0
O20_SHQ_log	1.0187	0.00048	2126.985	0
O15_GF_LE	0	0	0.77618	0.43824
O21_TFC				
(Intercept)	-3.21847	0.58377	-5.51326	0
O8_BAT_LE	-0.03182	0.19884	-0.16005	0.87295
O14_OI_LE	-0.18168	0.28366	-0.64048	0.52233
O23_GINV				
(Intercept)	-24.2635	35.62999	-0.68099	0.49643
O23_GINV_size	5.20169	8.38453	0.62039	0.53549
O23_GINV_DE	7.40905	4.9415	1.49935	0.13487
O23_GINV_log	-0.3027	0.07352	-4.11731	0.00005
Muscat_Securities_MSM_30_Index	0.12847	0.15416	0.83335	0.40533
O3_SOH_LE	-0.24079	0.3918	-0.61459	0.53931
O4_NIZ_LE	0.06717	0.18886	0.35565	0.72236
O5_HSBC_LE	-0.21954	0.15032	-1.46044	0.14525
O6_MUS_LE	-0.66639	0.61616	-1.08151	0.28037
O8_BAT_LE	-0.15878	0.16082	-0.98731	0.32432
O11_ANW_LE	-0.15563	0.15509	-1.00348	0.31647
O13_OEH_LE	-0.29187	0.1701	-1.71589	0.08725
O14_OI_LE	-0.04983	0.25956	-0.192	0.84788
O15_GF_LE	-0.15891	0.12851	-1.23661	0.21723
O17_AB_LE	0.15105	0.25129	0.60108	0.54826
O18_OFC_LE	0.16804	0.32851	0.51152	0.60938
O19_AMF_LE	0.34316	0.36381	0.94324	0.34635
O24_OOL_LE	-0.59206	0.46012	-1.28674	0.19921
O25_OI_LE	0.05369	0.29548	0.1817	0.85594
O26_DHO_LE	0.02577	0.62669	0.04111	0.96723
O28_MUH_LE	-0.60698	0.21098	-2.87696	0.00431

O29_OUI_LE	-1.24272	0.41252	-3.0125	0.00282
O24_OOL				
(Intercept)	-7.11697	3.3702	-2.11173	0.03553
O24_OOL_PBV	4.28209	3.03174	1.41242	0.15886
O24_OOL_log	-0.36644	0.29792	-1.23	0.21966
O3_SOH_LE	-0.3493	0.36912	-0.9463	0.34476
O6_MUS_LE	-0.47547	0.65259	-0.72859	0.46682
O7_FIN_LE	0.32857	0.13248	2.48007	0.01368
O9_MUS_LE	-0.257	0.37897	-0.67814	0.4982
O17_AB_LE	0.55987	0.34701	1.61342	0.1077
O23_GINV_LE	-0.14597	0.15152	-0.96339	0.33613
O26_DHO_LE	0.16254	0.60274	0.26967	0.7876
O25_OI				
(Intercept)	-1.59304	0.17086	-9.32344	0
O6_MUS_LE	0.04212	0.22595	0.18643	0.85223
O11_ANW_LE	0.021	0.04232	0.49616	0.62014
O14_OI_LE	-0.57794	0.17425	-3.31662	0.00102
O26_DHO_LE	-0.2603	0.11772	-2.21115	0.02776
O26_DHO				
(Intercept)	-8.33472	2.37114	-3.51507	0.00051
O26_DHO_PBV	2.64869	0.95671	2.76855	0.00601
O26_DHO_LEV	-1.04463	1.12678	-0.92709	0.35467
O26_DHO_MM	9.594	3.11035	3.08454	0.00224
O26_DHO_log	-0.1471	0.07454	-1.97337	0.04943
Repo_Rate	-1.68447	0.35975	-4.6823	0
Muscat_Securities_MSM_30_Index	-0.02496	0.0481	-0.51893	0.60422
MSM30_VOL	0.03622	0.02586	1.40058	0.16244
O1_OT_LE	-0.3296	0.11171	-2.95063	0.00344
O2_DHO_LE	-0.13204	0.10715	-1.23233	0.21886
O3_SOH_LE	0.11607	0.14997	0.77392	0.43963
O4_NIZ_LE	0.07912	0.07769	1.01843	0.30935
O5_HSBC_LE	0.27052	0.10624	2.54618	0.01142
O6_MUS_LE	-0.26147	0.11329	-2.30803	0.02172
O7_FIN_LE	0.05114	0.02423	2.11051	0.0357
O9_MUS_LE	0.09708	0.06091	1.59379	0.11211
O10_SEC_LE	-0.12858	0.04885	-2.63209	0.00896
O12_MADI_LE	-0.14865	0.04192	-3.54645	0.00046
O13_OEH_LE	-0.20707	0.08231	-2.51562	0.01244
O15_GF_LE	0.06894	0.064	1.07727	0.28228
O16_UF_LE	-0.02451	0.04327	-0.56636	0.5716
O17_AB_LE	-0.08124	0.08806	-0.92258	0.35702

O18_OFC_LE	0.03717	0.09584	0.38782	0.69844
O19_AMF_LE	-0.06227	0.35861	-0.17365	0.86227
O20_SHQ_LE	3.12307	0.3655	8.54459	0
O22_TAG_LE	-0.21194	0.1188	-1.78405	0.07549
O24_OOL_LE	0.06543	0.13551	0.4828	0.62962
O25_OI_LE	-0.08352	0.11712	-0.7131	0.47637
O27_DHOIS_LE	-0.22728	0.11204	-2.02865	0.04344
O28_MUH_LE	-0.25035	0.08616	-2.90568	0.00396
O27_DHOIS				
(Intercept)	-1.84834	0.21432	-8.62416	0
O27_DHOIS_log	-0.17027	0.13239	-1.28614	0.19937
O8_BAT_LE	-0.36183	0.11716	-3.08848	0.0022
O14_OI_LE	-0.34082	0.14537	-2.34451	0.01969
O15_GF_LE	0.06153	0.09894	0.62183	0.53452
O16_UF_LE	-0.34248	0.23933	-1.43101	0.15345
O29_OUI				
(Intercept)	-0.47629	0.62963	-0.75646	0.44998
Muscat_Securities_MSM_30_Index	0.15845	0.14391	1.10105	0.27177
MSM30_VOL	-0.09232	0.05511	-1.67503	0.09498
O1_OT_LE	0.1798	0.23613	0.76144	0.447
O2_DHO_LE	-0.56332	0.42438	-1.3274	0.1854
O3_SOH_LE	0.19024	0.15543	1.22395	0.22194
O6_MUS_LE	0.28375	0.32145	0.88273	0.3781
O8_BAT_LE	-0.06442	0.13578	-0.47444	0.63554
O11_ANW_LE	-0.11118	0.15928	-0.69803	0.48571
O13_OEH_LE	-0.49206	0.10052	-4.89506	0
O14_OI_LE	-0.10848	0.14303	-0.75845	0.44879
O17_AB_LE	-0.13759	0.23656	-0.58166	0.56124
O22_TAG_LE	-0.16477	0.24056	-0.68495	0.49391
O23_GINV_LE	-0.15253	0.1441	-1.05848	0.2907
O27_DHOIS_LE	-0.37001	0.26846	-1.37824	0.16917

Jordan				
Jordan				
	Value	Std. Error	*t*-ratio	*p*-values
J1_AB				
(Intercept)	-1.49398	0.7399	-2.01917	0.04438
I1_PBV	0.57915	0.84465	0.68567	0.49346
J1_AB_log	-0.1917	0.06787	-2.82438	0.00506
JOR_MARKET_INDEX	0.21067	0.0629	3.34917	0.00092
J2_JKB_LE	0.01524	0.12205	0.12488	0.9007

J5_CA_LE	-0.37704	0.16815	-2.24223	0.02569
J6_CB_LE	-0.07575	0.26142	-0.28977	0.77219
J10_BAE_LE	-0.14387	0.09576	-1.50231	0.13409
J11_JIB_LE	0.01663	0.16809	0.09893	0.92126
J12_CIG_LE	0.07952	0.08082	0.98388	0.32599
J14_JDI_LE	-0.07928	0.21502	-0.36871	0.71261
J18_SJ_LE	-0.04655	0.0618	-0.75321	0.45193
J20_OP_LE	-0.38835	0.06868	-5.65466	0
J23_JE_LE	0.10063	0.07086	1.42006	0.15665
J31_IBF_LE	-0.11844	0.12702	-0.93243	0.35188
J32_TCI_LE	-0.06448	0.18514	-0.34827	0.72789
J35_FF_LE	-0.08419	0.1308	-0.64368	0.52029
J37_NC_LE	0.04845	0.03249	1.49108	0.13702
J2_JKB				
(Intercept)	-1.0537	0.27356	-3.85185	0.00014
JOR_MARKET_INDEX	0.15602	0.14413	1.08245	0.2799
J5_CA_LE	-0.44551	0.37181	-1.19823	0.23175
J13_UI_LE	-0.13954	0.20318	-0.6868	0.49273
J16_AFI_LE	-0.52255	0.35623	-1.46686	0.14344
J3_BOJ				
(Intercept)	3.75773	2.60106	1.44469	0.14957
I3_PBV	-3.91334	2.3251	-1.68308	0.09339
J1_AB_LE	-0.34055	0.36043	-0.94484	0.34549
J11_JIB_LE	-0.04636	0.45002	-0.10302	0.91802
J16_AFI_LE	-0.2831	0.17771	-1.59303	0.11219
J25_AM_LE	-0.08362	0.20396	-0.40998	0.68211
J29_BIND_LE	-0.36446	0.12293	-2.96467	0.00327
J4_ABC				
(Intercept)	19.57174	6.65168	2.94237	0.00353
I4_DE	-0.07783	0.19117	-0.40714	0.68421
I4_MM	-11.4157	27.2083	-0.41957	0.67512
I4_PBV	-16.6085	4.12426	-4.02704	0.00007
J4_ABC_log	-0.08971	0.17442	-0.51437	0.6074
JOR_MARKET_INDEX	-0.03766	0.07857	-0.4794	0.63202
Inter_bank_rate	-0.35332	0.33286	-1.06144	0.28939
J2_JKB_LE	0.06436	0.33829	0.19026	0.84924
J6_CB_LE	-0.15655	0.23449	-0.66763	0.50492
J7_JC_LE	0.15957	0.10216	1.56188	0.11943
J8_HB_LE	0.20576	0.60465	0.34029	0.73389
J10_BAE_LE	-0.35798	0.23676	-1.51199	0.13165
J11_JIB_LE	-0.39795	0.31506	-1.2631	0.20759

J12_CIG_LE	0.04898	0.18167	0.2696	0.78767
J13_UI_LE	0.07442	0.16564	0.44927	0.65358
J14_JDI_LE	-0.07724	0.12612	-0.61239	0.54077
J15_JI_LE	0.20848	0.14648	1.42327	0.15576
J18_SJ_LE	-0.1667	0.14425	-1.15564	0.2488
J21_EFF_LE	-0.00202	0.08126	-0.02483	0.98021
J22_UFI_LE	-0.14987	0.16203	-0.92497	0.35577
J24_SG_LE	0.0417	0.14647	0.28467	0.77611
J26_ZARA_LE	-0.0639	0.16488	-0.38757	0.69863
J28_ISRA_LE	0.02898	0.19989	0.14497	0.88484
J29_BIND_LE	-0.06186	0.14823	-0.4173	0.67677
J32_TCI_LE	-0.25715	0.19281	-1.33369	0.18338
J33_AMAL_LE	-0.03968	0.11239	-0.35303	0.72433
J35_FF_LE	-0.08183	0.24987	-0.32749	0.74354
J36_BI_LE	0.01116	0.61102	0.01827	0.98543
J5_CA				
(Intercept)	0.3094	1.07995	0.2865	0.7747
I5_PBV	-1.47906	0.78744	-1.87832	0.06131
J5_CA_log	-0.22655	0.07564	-2.99501	0.00297
JOR_MARKET_INDEX	-0.1023	0.09137	-1.11959	0.26379
JOR_IMP_VOL	0.07004	0.03135	2.23434	0.0262
J1_AB_LE	-0.16084	0.14068	-1.14332	0.25382
J2_JKB_LE	-0.2428	0.10123	-2.39852	0.01707
J3_BOJ_LE	-0.09729	0.22076	-0.44072	0.65973
J9_JAB_LE	-0.48288	0.14946	-3.23092	0.00137
i	-0.44173	0.14869	-2.97087	0.00321
J15_JI_LE	-0.11947	0.24207	-0.49353	0.622
J31_IBF_LE	-0.12919	0.12693	-1.01779	0.3096
J7_JC				
(Intercept)	0.11543	1.00367	0.11501	0.90852
I7_PBV	-2.08214	0.9029	-2.30605	0.02181
J7_JC_log	-0.27176	0.1225	-2.21841	0.02729
JOR_MARKET_INDEX	0.28021	0.19226	1.45744	0.14606
J2_JKB_LE	-0.47701	0.82212	-0.58022	0.56221
J3_BOJ_LE	0.3604	0.44119	0.81687	0.41466
J5_CA_LE	-0.2816	0.73519	-0.38303	0.70197
J15_JI_LE	0.07501	0.55165	0.13597	0.89194
J16_AFI_LE	-0.05909	0.14277	-0.41386	0.67928
J19_SAQ_LE	-0.40623	1.61692	-0.25123	0.80181
J21_EFF_LE	0.17566	0.10826	1.62261	0.10575
J25_AM_LE	-0.05429	0.32478	-0.16717	0.86735

J26_ZARA_LE	0.07391	0.31173	0.2371	0.81274
J27_AEFR_LE	0.1297	0.28981	0.44752	0.65483
J30_JLG_LE	-0.25907	0.32723	-0.79172	0.42916
J31_IBF_LE	-0.21897	0.08646	-2.53266	0.01184
J36_BI_LE	0.05935	1.84251	0.03221	0.97432
J37_NC_LE	0.1325	0.11211	1.18181	0.23824
J7_JC				
(Intercept)	0.04004	0.50856	0.07872	0.93731
I7_PBV	-0.81143	0.55297	-1.46742	0.14334
J7_JC_log	0.02643	0.04204	0.62868	0.53005
JOR_MARKET_INDEX	0.12697	0.04975	2.55218	0.01121
J2_JKB_LE	0.0824	0.13523	0.60936	0.54276
J3_BOJ_LE	-0.09052	0.31073	-0.29132	0.77101
J5_CA_LE	0.10155	0.17646	0.57547	0.56542
J15_JI_LE	0.00343	0.05945	0.05776	0.95398
J16_AFI_LE	0.08221	0.09846	0.83497	0.40442
J19_SAQ_LE	-0.00054	0.05077	-0.01056	0.99159
J21_EFF_LE	0.05734	0.05138	1.11596	0.26536
J25_AM_LE	0.09833	0.15649	0.62837	0.53025
J26_ZARA_LE	0.01591	0.14264	0.11152	0.91128
J27_AEFR_LE	0.00842	0.13973	0.06023	0.95202
J30_JLG_LE	0.09434	0.10163	0.92826	0.35403
J31_IBF_LE	-0.07866	0.06375	-1.23384	0.21825
J36_BI_LE	0.00493	0.00509	0.96817	0.33376
J37_NC_LE	-0.02657	0.06093	-0.43601	0.66315
J9_JAB				
(Intercept)	2.4564	1.75034	1.40338	0.16158
I9_MM	5.93371	6.21376	0.95493	0.34042
I9_PBV	-4.75849	1.89074	-2.51673	0.01239
J9_JAB_log	-0.05255	0.09636	-0.54533	0.58595
JOR_MARKET_INDEX	0.28354	0.06487	4.37114	0.00002
JOR_IMP_VOL	0.05118	0.06042	0.84703	0.39768
Tbill_Monthly_Interest_rate	-0.09207	0.12038	-0.76481	0.44501
J1_AB_LE	0.0568	0.21499	0.26419	0.79183
J2_JKB_LE	-0.22201	0.20389	-1.08887	0.27713
J5_CA_LE	-0.36456	0.19604	-1.85967	0.06395
J6_CB_LE	0.21439	0.16425	1.30528	0.19284
J8_HB_LE	-0.2775	2.35453	-0.11786	0.90626
J11_JIB_LE	-0.00168	0.31269	-0.00536	0.99573
J12_CIG_LE	0.0732	0.19212	0.38099	0.70349
J14_JDI_LE	0.0045	0.2491	0.01807	0.98559

J20_OP_LE	-0.16389	0.11066	-1.48102	0.1397
J21_EFF_LE	-0.11355	0.13299	-0.85377	0.39394
J22_UFI_LE	-0.05284	0.24326	-0.2172	0.82821
J23_JE_LE	-0.09161	0.13976	-0.65551	0.51266
J25_AM_LE	0.01275	0.08041	0.15851	0.87417
J27_AEFR_LE	-0.34164	0.11776	-2.90101	0.00401
J28_ISRA_LE	0.02523	0.085	0.29683	0.76681
J34_FAR_LE	0.02847	0.0728	0.39104	0.69605
J36_BI_LE	-0.05833	0.02002	-2.91423	0.00385
J10_BAE				
(Intercept)	1.30884	1.06646	1.22727	0.22068
J10_PBV	-4.13377	1.47174	-2.80876	0.0053
JOR_MARKET_INDEX	0.20741	0.0847	2.44891	0.0149
J1_AB_LE	0.02375	0.2826	0.08405	0.93308
J11_JIB_LE	-0.66802	0.35961	-1.85761	0.0642
J13_UI_LE	0.18747	0.12295	1.52478	0.12837
J16_AFI_LE	-0.3242	0.3209	-1.01027	0.31318
J18_SJ_LE	0.18083	0.2142	0.84424	0.39921
J23_JE_LE	-0.09193	0.17724	-0.51865	0.60439
J24_SG_LE	-0.32385	0.29002	-1.11663	0.26505
J27_AEFR_LE	-0.16673	0.15593	-1.06924	0.28582
J11_JIB				
(Intercept)	1.07112	0.62444	1.71534	0.08734
J11_PBV	-0.91769	0.38379	-2.39114	0.01743
JOR_MARKET_INDEX	-0.02765	0.10387	-0.26617	0.7903
J1_AB_LE	-0.13698	0.15314	-0.89448	0.3718
J4_ABC_LE	-0.44824	0.31883	-1.40588	0.16081
J9_JAB_LE	-0.18563	0.19558	-0.94909	0.34335
J10_BAE_LE	-0.08559	0.19452	-0.44003	0.66024
J13_UI_LE	-0.05851	0.09236	-0.63349	0.52691
J14_JDI_LE	-0.29069	0.15903	-1.82791	0.06858
J15_JI_LE	-0.06749	0.05219	-1.29323	0.19695
J25_AM_LE	-0.42468	0.25489	-1.66609	0.09676
J27_AEFR_LE	-0.30806	0.117	-2.63306	0.00891
J28_ISRA_LE	-0.33154	0.16348	-2.02804	0.04346
J29_BIND_LE	-0.11722	0.13159	-0.89079	0.37377
J31_IBF_LE	0.06164	0.03012	2.04639	0.04161
J35_FF_LE	0.22539	0.14701	1.53318	0.12631
J36_BI_LE	-0.00246	0.07131	-0.03453	0.97248
J12_CIG				
(Intercept)	-2.66556	0.39725	-6.71007	0

J12_CIG_log	0.17085	0.11993	1.42457	0.1553
J16_AFI_LE	-0.60371	0.46848	-1.28868	0.19848
J18_SJ_LE	-0.19177	0.17602	-1.08949	0.27679
J13_UI				
(Intercept)	-1.77108	0.672	-2.63552	0.00885
JOR_MARKET_INDEX	0.14728	0.11939	1.23365	0.21832
Tbill_Monthly_Interest_rate	0.03892	0.08285	0.46974	0.63889
J2_JKB_LE	-0.31982	0.47168	-0.67805	0.49827
J4_ABC_LE	-0.17957	0.42296	-0.42456	0.67147
J5_CA_LE	-0.21692	0.24622	-0.88099	0.37904
J10_BAE_LE	0.19873	0.21074	0.94299	0.34646
J11_JIB_LE	-0.21131	0.42828	-0.49339	0.6221
J14_JDI_LE	0.05835	0.244	0.23915	0.81115
J15_JI_LE	-0.02896	0.36373	-0.07961	0.9366
J16_AFI_LE	-0.29768	0.15108	-1.97034	0.04973
J18_SJ_LE	-0.24914	0.09827	-2.53524	0.01175
J20_OP_LE	0.03431	0.07787	0.44063	0.6598
J23_JE_LE	-0.14112	0.18645	-0.75691	0.44971
J33_AMAL_LE	-0.3179	0.20557	-1.54645	0.12307
J37_NC_LE	0.01151	0.07978	0.14424	0.88541
J14_JDI				
(Intercept)	-292.336	298.597	-0.97903	0.32846
J14_size	57.98887	58.7668	0.98676	0.32466
J14_LEV	4.32927	1.67005	2.59229	0.01006
J14_DE	-3.09155	1.26934	-2.43555	0.01553
J14_MM	773.9854	290.367	2.66554	0.00816
J14_PBV	-22.6339	7.47252	-3.02895	0.0027
J14_JDI_log	0.00365	0.15322	0.02385	0.98099
JOR_MARKET_INDEX	0.15879	0.18473	0.85962	0.39078
JOR_IMP_VOL	-0.44158	0.15151	-2.91455	0.00387
Inter_bank_rate	1.34644	0.70509	1.9096	0.05726
Tbill_Monthly_Interest_rate	-0.3528	0.30382	-1.16121	0.2466
J1_AB_LE	0.04435	0.27881	0.15906	0.87374
J2_JKB_LE	0.18004	0.18589	0.96855	0.33365
J3_BOJ_LE	-0.03313	0.24366	-0.13596	0.89196
J4_ABC_LE	0.20339	0.30265	0.67204	0.50214
J5_CA_LE	-0.07339	0.22341	-0.3285	0.74279
J6_CB_LE	-0.30277	0.32838	-0.92201	0.35736
J7_JC_LE	-0.04988	0.14943	-0.33379	0.7388
J8_HB_LE	0.3114	0.58735	0.53018	0.59643
J9_JAB_LE	0.03918	0.30271	0.12943	0.89712

J10_BAE_LE	-0.02058	0.28704	-0.07171	0.94289
J11_JIB_LE	0.04669	0.39852	0.11715	0.90683
J12_CIG_LE	0.17799	0.30668	0.58036	0.56216
J13_UI_LE	-0.34905	0.16164	-2.15936	0.03172
J15_JI_LE	0.47592	0.22862	2.08172	0.03833
J16_AFI_LE	0.11704	0.34522	0.33902	0.73486
J18_SJ_LE	-0.04899	0.10502	-0.46648	0.64125
J19_SAQ_LE	0.1667	0.20796	0.80161	0.4235
J20_OP_LE	0.18474	0.15671	1.17884	0.23952
J21_EFF_LE	0.0669	0.10621	0.62992	0.52929
J22_UFI_LE	0.13218	0.21873	0.60429	0.54617
J23_JE_LE	-0.00193	0.15398	-0.01257	0.98998
J24_SG_LE	-0.04069	0.17072	-0.23835	0.81179
J25_AM_LE	0.04714	0.17552	0.26859	0.78846
J26_ZARA_LE	-0.09395	0.15074	-0.62326	0.53365
J27_AEFR_LE	0.02089	0.16922	0.12347	0.90183
J28_ISRA_LE	0.10624	0.23718	0.44792	0.65458
J29_BIND_LE	0.00729	0.10131	0.07198	0.94267
J30_JLG_LE	-0.01914	0.18864	-0.10148	0.91924
J31_IBF_LE	-0.13007	0.08843	-1.4708	0.14253
J32_TCI_LE	0.14325	0.23017	0.62236	0.53424
J33_AMAL_LE	-0.20957	0.11644	-1.79975	0.07304
J34_FAR_LE	-0.1864	0.21384	-0.87169	0.38416
J35_FF_LE	-0.06572	0.19731	-0.33309	0.73933
J36_BI_LE	0.01333	0.04064	0.328	0.74317
J37_NC_LE	-0.14463	0.06992	-2.06841	0.03957
J15_JI				
(Intercept)	-0.90299	0.53458	-1.68917	0.09221
Inter_bank_rate	-0.28467	0.21644	-1.31526	0.18941
J6_CB_LE	-0.86006	0.15565	-5.52576	0
J13_UI_LE	-0.50124	0.38561	-1.29985	0.19463
J33_AMAL_LE	-0.02363	0.49541	-0.0477	0.96199
J16_AFI				
(Intercept)	-0.3882	0.69469	-0.55881	0.57671
I16_DE	-0.03681	0.18406	-0.2	0.84162
I16_MM	-0.83225	5.72065	-0.14548	0.88443
JOR_MARKET_INDEX	0.22048	0.3287	0.67077	0.50289
J1_AB_LE	-0.63519	0.3531	-1.79892	0.07305
J10_BAE_LE	-0.56203	0.4735	-1.18699	0.23618
J11_JIB_LE	0.18411	0.64691	0.2846	0.77615
J12_CIG_LE	-0.20762	0.19075	-1.08847	0.27727

J13_UI_LE	-0.23617	0.23537	-1.00344	0.31647
J15_JI_LE	0.24048	0.24645	0.97577	0.32997
J20_OP_LE	-0.14282	0.46616	-0.30638	0.75953
J23_JE_LE	-0.30136	0.33095	-0.91058	0.36325
J25_AM_LE	-0.12825	0.41742	-0.30724	0.75888
J33_AMAL_LE	-0.41581	0.35008	-1.18775	0.23588
J18_SJ				
(Intercept)	-2.41886	1.31958	-1.83305	0.06781
I18_MM	-2.77421	2.56041	-1.0835	0.27947
J18_SJ_log	-0.0747	0.08649	-0.8636	0.38851
JOR_MARKET_INDEX	0.00945	0.18841	0.05015	0.96003
Tbill_Monthly_Interest_rate	0.31595	0.16464	1.919	0.05595
J10_BAE_LE	0.28409	0.26128	1.08727	0.27781
J12_CIG_LE	-0.10896	0.18495	-0.58912	0.55623
J13_UI_LE	-0.00947	0.23309	-0.04064	0.96761
J14_JDI_LE	0.32029	0.51341	0.62384	0.53322
J15_JI_LE	0.13267	0.12191	1.08829	0.27736
J21_EFF_LE	-0.06268	0.13625	-0.46005	0.64582
J22_UFI_LE	-0.21983	0.24258	-0.90621	0.36557
J29_BIND_LE	-0.07972	0.76347	-0.10442	0.9169
J31_IBF_LE	-0.19738	0.18916	-1.04343	0.29761
J32_TCI_LE	-0.67258	0.43503	-1.54606	0.12317
J34_FAR_LE	-0.6238	0.1075	-5.8028	0
J36_BI_LE	0.0157	0.12933	0.1214	0.90345
J19_SAQ				
(Intercept)	100.6971	42.97405	2.34321	0.01977
I19_LEV	-102.445	42.413	-2.41542	0.01631
I19_PBV	1.00157	1.19202	0.84023	0.40145
J19_SAQ_log	0.04417	0.30032	0.14709	0.88316
Inter_bank_rate	0.87284	0.409	2.1341	0.03365
J7_JC_LE	0.04117	0.2672	0.1541	0.87764
J8_HB_LE	1.58563	0.53594	2.95859	0.00334
J10_BAE_LE	-0.21133	0.43151	-0.48974	0.62468
J25_AM_LE	-0.51905	0.1588	-3.26862	0.00121
J33_AMAL_LE	-0.34279	0.28705	-1.19417	0.23336
J34_FAR_LE	0.05251	0.34054	0.1542	0.87756
J20_OP				
(Intercept)	-2.46671	1.9644	-1.2557	0.21025
I20_PBV	-1.82787	1.50516	-1.2144	0.2256
J20_OP_log	0.18878	0.24262	0.77811	0.43715
JOR_MARKET_INDEX	0.51285	0.38503	1.33199	0.18392

Inter_bank_rate	0.14905	0.56795	0.26243	0.79318
J1_AB_LE	0.26853	0.67057	0.40044	0.68913
J3_BOJ_LE	0.44735	2.02791	0.2206	0.82556
J5_CA_LE	0.29907	0.78539	0.38079	0.70364
J6_CB_LE	-0.10026	0.93349	-0.1074	0.91454
J8_HB_LE	1.34115	3.42208	0.39191	0.69542
J9_JAB_LE	-1.06911	0.73957	-1.44558	0.14939
J10_BAE_LE	-0.43868	0.67751	-0.6475	0.51783
J12_CIG_LE	-0.34663	0.73287	-0.47297	0.6366
J13_UI_LE	0.05168	0.56468	0.09152	0.92714
J14_JDI_LE	0.10168	0.47024	0.21622	0.82897
J16_AFI_LE	-0.10162	0.65907	-0.15418	0.87758
J18_SJ_LE	-0.36696	0.24767	-1.48161	0.13954
J22_UFI_LE	0.33846	0.32277	1.04861	0.29524
J23_JE_LE	0.29213	0.62901	0.46442	0.6427
J27_AEFR_LE	0.42159	0.40457	1.04207	0.29826
J30_JLG_LE	-0.05086	0.57003	-0.08922	0.92897
J31_IBF_LE	-0.3665	0.38396	-0.95451	0.34063
J33_AMAL_LE	-0.41743	0.18397	-2.26903	0.02401
J36_BI_LE	0.10425	0.2055	0.50732	0.61232
J37_NC_LE	-0.21806	0.13235	-1.64753	0.10055
J21_EFF				
(Intercept)	-2.55655	0.76361	-3.34795	0.00092
I21_PBV	0.0216	0.28506	0.07576	0.93966
J13_UI_LE	-0.07434	0.20857	-0.35645	0.72175
J18_SJ_LE	0.2232	0.12696	1.75802	0.07974
J33_AMAL_LE	-0.08995	0.18692	-0.48123	0.6307
J22_UFI				
(Intercept)	-2.71308	0.33992	-7.98142	0
JOR_MARKET_INDEX	0.14775	0.19042	0.77591	0.4384
J4_ABC_LE	-1.52464	0.67193	-2.26904	0.02396
J33_AMAL_LE	-0.09247	0.13842	-0.66804	0.50461
J24_SG				
(Intercept)	-1.72635	0.39334	-4.389	0.00002
J24_SG_log	-0.01364	0.19654	-0.0694	0.94472
JOR_MARKET_INDEX	0.43496	0.19741	2.20336	0.02832
J6_CB_LE	-0.11961	0.26964	-0.44358	0.65766
J10_BAE_LE	-0.51981	0.39393	-1.31955	0.18797
J26_ZARA_LE	-0.4652	0.21938	-2.12053	0.03477
J29_BIND				
(Intercept)	-0.91774	0.87656	-1.04698	0.29596

I29_MM	3.33604	2.86523	1.16432	0.24522
JOR_IMP_VOL	-0.11196	0.12125	-0.92341	0.35654
J3_BOJ_LE	0.03322	0.20898	0.15897	0.8738
J4_ABC_LE	-0.6593	0.42845	-1.53879	0.12491
J6_CB_LE	0.25025	0.27334	0.91554	0.36065
J8_HB_LE	0.21451	0.99266	0.21609	0.82906
J11_JIB_LE	-0.44184	0.41611	-1.06182	0.28917
J14_JDI_LE	0.1861	0.45427	0.40968	0.68233
J21_EFF_LE	-0.16492	0.05956	-2.76894	0.00598
J24_SG_LE	-0.05389	0.1253	-0.43005	0.66747
J25_AM_LE	-0.4961	0.24643	-2.01313	0.045
J33_AMAL				
(Intercept)	-3.26621	1.21089	-2.69735	0.00738
JOR_MARKET_INDEX	0.01819	0.40088	0.04536	0.96385
J2_JKB_LE	0.26719	0.70305	0.38005	0.70418
J3_BOJ_LE	0.45319	1.4666	0.30901	0.75753
J13_UI_LE	-0.50686	0.18527	-2.73572	0.0066
J16_AFI_LE	-0.03127	0.54113	-0.05779	0.95396
J19_SAQ_LE	-0.70088	0.22677	-3.0907	0.00218
J20_OP_LE	-0.16553	0.63248	-0.26171	0.79372
J21_EFF_LE	0.34962	0.23578	1.48284	0.13917
J22_UFI_LE	0.20574	0.31155	0.66039	0.50951
J25_AM_LE	0.22265	0.434	0.51301	0.60832